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CH2MHILL

April 11, 2003
172769

Mr. Bob Eller
Siting Project Manager
California Energy Commission
1516 Ninth Street, MS-15
Sacramento, CA 95814-5504

RE: Data Response, Set 2A
Walnut Energy Center (02-AFC-4)

On behalf of the Turlock Irrigation District, please find attached 12 copies and one original of our Data Responses, Set 2A, in response to Staff's data request of March 18, 2003. In addition, five CD-ROMS of the "Revised Project and Construction Emissions Modeling Analysis" is being provided.

Please call me if you have any questions.

Sincerely,

CH2M HILL

John L. Carrier

John L. Carrier, J.D.
Program Manager

c: Project File
Proof of Service List

WALNUT ENERGY CENTER
(02-AFC-4)

DATA RESPONSE, SET 2A

(Responses to Data Requests: 103-112)

Submitted by

TURLOCK IRRIGATION DISTRICT (TID)

April 11, 2003

CH2MHILL

2485 Natomas Park Drive, Suite 600
Sacramento, California 95833-2937

WALNUT ENERGY CENTER
(02-AFC-4)
DATA RESPONSES, SET 2A

Technical Area: Air Quality
CEC Authors: William Walters and Lisa Blewitt
WEC Authors: Jeff Adkins and Gary Rubenstein

BACKGROUND

Construction Emission Calculations

Staff has determined that the construction emission calculations appear to be flawed. The worst case day and annual construction emission calculations for the WEC are essentially identical to those provided for the San Joaquin Valley Energy Center (SJVEC) and the Inland Empire Energy Center (IEEC). These are different projects and have site specific parameters that need to be used to calculate the construction emissions. Additionally, Staff has found several questionable assumptions used to calculate the construction emissions. Staff requires additional information to determine how extensively the construction emission calculations will need to be revised.

DATA REQUESTS

103. Please identify how it is possible that almost all of the construction emissions assumptions; hourly, daily, monthly and annual, for the WEC, SJVEC, and IEEC projects could be identical.

Response: For the construction impact analyses performed for the WEC, SJVEC, and IEEC projects, it is assumed that the worst case hourly, daily, and monthly construction related emissions will be the same for all three projects. This is because it is expected that the projects will have similar levels of worst case daily and monthly construction intensity. In addition, since all three projects are expected to take more than one year but less than two years to construct, for all three projects the worst case average annual construction emissions occur during the first year of construction and are based on an average of 250 construction workdays per year. The fact that one project may take longer to construct than another will not affect this worst-case annual average emission rate assumption. The following are the site-specific factors that change depending on the project:

- Site-specific water evaporation rate
- Duration of daily active construction operations
- Number of days per year of active construction operations (if construction schedule is less than 1 year)
- Disturbed area affected by wind erosion

104. The worst-case daily construction equipment load factors do not seem to be reasonable. The following table presents, for specific equipment of concern, the load factors calculated by Staff versus the typical load factors provided by the SCAQMD in their CEQA Air Quality Handbook. The load factors were

calculated using the hourly fuel usage data provided in AFC Appendix 8.1D-1 assuming 0.40 lb/diesel fuel per HP/hr.

Considering that the worst-case day assumes no more than 8-hours of operation, and in some cases a maximum of only 2 or 4 hours of operation, the hourly load factors do not seem reasonable and have not been justified. Please provide a reference that justifies the fuel consumption assumptions used, or provide a revised equipment emission calculation using load factors that can be justified.

Equipment	Assumed Equipment Model	HP	Fuel Use Gals/hr	Applicant's Maximum Hourly Load Factor	SCAQMD Load Factors[a]	Applicant's Worst-Case Hour/day
Crawler Crane- Greater than 300 ton	Manitowoc - 831 Ton Crane	600	7.50	22.22%	43%	2
Crawler Crane- Greater than 200 ton	Link Belt - 250 Ton Crane	450	5.00	19.75%	43%	4
Crane - Mobile 65 ton	Link Belt - 70 Ton Crane	365	4.00	19.48%	43%	4
Cranes -Mobile 45 ton	Grove - 40 Ton Crane	300	4.00	23.70%	43%	4
Cranes - Mobile 35 ton	Grove - 40 Ton Crane	300	4.00	23.70%	43%	4
Excavator- Trencher	Caterpilar Handbook – 225D	150	2.00	23.70%	69.5%	8
Excavator- Earth Scraper	Caterpilar Handbook – 651E	550	9.00	29.09%	66%	8
Excavator-Motor Grader	14H Motor Grader – Cat Website	215	5.00	41.34%	57.5%	8
Excavator – loader	Caterpilar Handbook – 966E	216	2.50	20.57%	54%	8
Truck- Water	CAT 769 – Cat Handbook	510	3.13	10.91%	41%[b]	8
Dump Truck	Mack RS 600	350	3.13	15.90%	38%	8
Service Truck- 1 ton	F-250	235	1.56	11.80%	41%[b]	8
Truck- Fuel/Lube	Mack E-7	350	3.13	15.90%	41%[b]	2
Concrete Pumper Truck	Mack EM-7 300	310	3.13	17.95%	41%[b]	8
Tractor Truck 5th Wheel	International 8100	280	3.13	19.87%	41%[b]	8
Trucks- 3 ton	F-450	325	1.56	8.53%	41%[b]	8

a – South Coast Air Quality Management District CEQA Air Quality Handbook Table A9-8-D.
b – Load factor for Off-Highway Trucks

Response: It is important to note that, in this data request, the Staff is asking the applicant to explain an alleged discrepancy between the Staff's calculated load factors and an SCAQMD guidance document. There are two major assumptions in the CEC Staff's analysis of the load factors used for the construction equipment associated with the construction phase of the WEC project that significantly affect the Staff's conclusion – equipment make/model and appropriate load factor for trucks. The first major assumption is the Staff's assumed equipment makes and models used for the cranes, trenchers, scrapers, graders, and loaders. The WEC construction impact analysis was based on the following equipment models:

- Bulldozers – Caterpillar Models D6H and D4C
- Excavators – Caterpillar Model E110
- Graders – Caterpillar Model 140B
- Backhoes – Caterpillar Model 426
- Loaders – Caterpillar Model 916
- Scrapers – Caterpillar Model 615C
- 65-ton Cranes – Caterpillar Model 572G hoist
- 200-ton Cranes – Caterpillar Model 578 hoist
- 300-ton Cranes – Caterpillar Model 589 hoist

As shown in the data request, the CEC Staff assumed the use of difference equipment.

The average fuel use levels for the equipment assumed for the WEC analysis were estimated based on operating specifications from the Caterpillar Performance Handbook. In response to this data request, to verify these levels for the cranes that may be used during the construction of the WEC project (as an example), we reviewed equipment specifications from the web sites for Link Belt Construction Equipment and Grove Cranes to develop the following Table AQ104-1. As shown in Table AQ104-1 using the same brake-specific fuel consumption factor of 0.4 lbs Diesel/bhp-hr and the SCAQMD CEQA guideline load factor of 43% used by the CEC Staff, there are cranes available with calculated fuel use levels similar to the levels used for the WEC construction analysis. It is difficult to know at this point the exact equipment that will be used on the WEC project construction site; however, we believe that the fuel use levels used for the WEC construction analysis are reasonable.

Similarly, The CEC Staff's assumptions regarding equipment make and model number significantly impact the Staff's calculation of hourly fuel use for the trenchers, scrapers, graders, and loaders. As shown in Table AQ104-2, Caterpillar provides three ranges of fuel

TABLE AQ104-1
Fuel Use for Cranes

Equipment	Make/Model	Crane Engine Rating[a]	Load Factor[b]	Calculated Fuel Use[c] (gals/hr)	Fuel Use – WEC Analysis (gals/hr)
Crane - Greater than 300 ton	Grove – GMK 6350 (350 ton)	260 hp	43%	6.3	7.5
Crane - Greater than 200 ton	Grove GMK 5240 (240 ton)	165 hp	43%	4.0	5.0
Crane - 65 ton	Link Belt ATC-3130 (130 ton)	170 hp	43%	4.1	4.0
Crane - 45 ton	Grove RT 600E (50 ton)	165 hp	43%	4.0	4.0
Crane - 35 ton	Link Belt RTC-8040 II (40 ton)	165 hp	43%	4.0	4.0

Footnotes (Table AQ104-1):

[a] Based on information on Grove Crane and Link Belt Construction Equipment web sites.

[b] South Coast Air Quality Management District CEQA Air Quality Handbook Table A9-8-D.

[c] Based on 0.4 lb Diesel/hp-hr and 7.1 lbs/gal Diesel

TABLE AQ104-2
Fuel Use for Scrapers, Graders, Wheel Loaders, and Excavators

Equipment	Engine Rating[a]	Fuel Use – Low[a] (gals/hr)	Fuel Use – Medium[a] (gals/hr)	Fuel Use – High[a] (gals/hr)	Fuel Use – WEC Analysis (gals/hr)
Scrapers					
Cat. Model 613C Series II	175 hp (flywheel)	4-5	5.5-6.5	7.25-9	9.0
Cat. Model 615C Series II	265 hp (flywheel)	6-7	8-9.5	11-12.5	9.0
Cat. Model 623F	365 hp (flywheel)	8-9.5	10.5-12	14-15.5	9.0
Graders					
Cat. Model 12H	140 hp (flywheel)	2.9-4.2	4.2-5.5	5.5-6.7	5.0
Cat. Model 143H	150 hp (flywheel)	3.2-4.6	4.6-5.9	5.9-7.3	5.0
Cat. Model 16H	275 hp (flywheel)	5.0-7.1	7.1-9.2	9.2-11.3	5.0
Wheel Loaders					
Cat. Model 914G	90 hp (flywheel)	1-2	2-2.75	3-3.5	2.5
Cat. Model 924F	105 hp (flywheel)	1.5-2	2.5-3	3.5-4	2.5
Cat. Model 928G	125 hp (flywheel)	2-3	3-4	4-5	2.5
Excavators					
Cat. Model 307	54 hp (flywheel)	0.75-1.25	1.25-2	1.75-2.5	2.0
Cat. Model 315	99 hp (flywheel)	1.25-2.25	2.25-3.5	3.5-4	2.0
Cat. Model M320	139 hp (flywheel)	2-3.5	3.5-4.5	4.5-5.5	2.0

Footnotes (Table AQ104-2):

[a] Based on Caterpillar Performance Handbook, Edition 28.

use levels (low, medium, and high) for trenchers, scrapers, graders, and loaders. Since the WEC construction site is level and the soil characteristics are not unusual, it is not appropriate to use the high fuel use level because this factor is to be used only for unusual site conditions such as extremely rocky soil. As shown in Table AQ104-2, based on a review of information in the Caterpillar performance handbook, there are several equipment models available with fuel use levels similar to the levels assumed for the WEC construction analysis. Again, it is difficult to know at this point the exact equipment that will be used on the WEC project construction site; however, we believe that the fuel use levels used for the WEC construction analysis are reasonable.

A second major assumption in the CEC Staff's analysis is the load factor assumed for the trucks that will be used during the construction of the WEC project. For trucks, the CEC Staff assumed a load factor of 41% based on the SCAQMD CEQA guideline for off-highway trucks. The SCAQMD CEQA guideline cites EPA's November 1991 "Nonroad Engine and Vehicle Emissions Study" as the reference source for the 41% load factor. In the context of EPA's "Nonroad Engine and Vehicle Emissions Study", off-highway trucks are large dump trucks with maximum gross vehicle weights ranging from 150,000 lbs to 830,000 lbs. These trucks are too massive to legally travel on public roadways and are mainly used in large mining operations. Because operation at a mining facility often requires pulling loads up sloped haul roads, the relatively high load factor of 41% would be reasonable for these types of facilities. However, this load factor is too high for operation of trucks on a level construction site like the WEC project site. For the WEC construction site, rather than off-highway trucks, all of the trucks for this project are expected to be on-highway heavy and medium duty Diesel trucks. The WEC construction analysis was based on the following for truck operation:

- Medium Duty Diesel Trucks – 50 gallon Diesel fuel tank, 25% of the tank used each day, and 8 hrs/day of operation results in an hourly Diesel fuel use of 1.56 gals/hr.
- Heavy Duty Diesel Trucks – 100 gallon Diesel fuel tank, 25% of the tank used each day, and 8 hrs/day of operation results in an hourly Diesel fuel use of 3.13 gals/hr.

In response to this data request, to check the truck fuel use rates used for the WEC construction analysis, we reviewed the fuel use factors in the EMFAC2002 model for on-highway Diesel trucks operating at low speeds. As shown in Table AQ104-3 below, based on the average on-highway Diesel truck fleet in the San Joaquin Valley in 2003, the calculated truck fuel use using this approach is lower than the levels assumed for the WEC construction analysis. Therefore, the fuel use levels used for the WEC construction analysis are believed to be reasonable.

TABLE AQ104-3
Fuel Use for Trucks

Equipment	On-Highway Classification[a]	Fuel Use[b] (mile/gal)	Average[c] Speed (mph)	Calculated Hourly Fuel Use (gals/hr)	Fuel Use – WEC Analysis (gals/hr)
Truck- Water	Heavy Duty Diesel Truck	5.19	10	1.9	3.13
Dump Truck	Heavy Duty Diesel Truck	5.19	10	1.9	3.13
Service Truck- 1 ton	Medium Duty Diesel Truck	21.04	10	0.5	1.56
Truck- Fuel/Lube	Heavy Duty Diesel Truck	5.19	10	1.9	3.13
Concrete Pumper Truck	Heavy Duty Diesel Truck	5.19	10	1.9	3.13
Tractor Truck 5th Wheel	Heavy Duty Diesel Truck	5.19	10	1.9	3.13
Trucks- 3 ton	Medium Duty Diesel Truck	21.04	10	0.5	1.56

Footnotes (Table AQ104-3):

[a] Assumed on-highway vehicle classification.

[b] Based on EMFAC 2002, V2.2, September 23, 2002, fleet average for San Joaquin Valley Air Basin 2003 summer (model years 1965 to 2003) with low speed operation (10 mph).

[c] Assumed average onsite hourly vehicle speed considering that the posted speed limit will be 15 mph for the construction site.

105. The fugitive dust control efficiency used in the emission calculations (88%) is from a single control efficiency calculation that is specific to unpaved road dust suppression control. Further, this calculation is to be used for compacted unpaved roads. Please revise the control efficiency calculations for the paved road fugitive dust sources to be consistent with EPA or ARB methodologies for each type of fugitive dust emission source.

Response: The water application dust control efficiency of 88% used in the construction impact analysis for the WEC project was calculated from the following equation found in EPA's report on Control of Open Fugitive Dust Sources[1]:

[1] EPA, Control of Open Fugitive Dust Sources, September 1988, equation 5-4.

C = 100 – (0.8*p*d*t)/i

Where:

C = average dust control efficiency, in percent

p = potential average hourly daytime evaporation rate in mm/hr

d = average hourly daytime traffic rate in vehicles per hour

i = water application intensity in L/m2

t = time between water application in hours

This equation is used to estimate the dust control levels associated with the application of water to unpaved roads. As shown in Attachment 8.1D-1 of the construction impact analysis performed for the WEC project, water application dust control was assumed for the following construction activities:

- Bulldozer operation
- Scraper unpaved road travel
- Motor grader operation
- Loader excavation
- Loader unpaved road travel
- Water truck unpaved road travel
- Forklift unpaved road travel
- Dump truck unpaved road travel
- Fuel/lube truck unpaved road travel
- Pickup truck unpaved road travel
- 3-ton truck unpaved road travel
- Windblown dust
- Delivery truck unpaved road travel

In the construction analysis, dust control associated with water application was not assumed for scraper excavation or dump truck unloading. As shown above, of the thirteen construction operations where water application control was used, nine were for unpaved road travel. Since the dust generated by bulldozer and motor grader operations is due mainly to unpaved road travel type emissions (i.e., treads/wheels generating dust while traveling on an unpaved surface), the unpaved road travel water application control efficiency was also used for these operations in the WEC construction analysis.

EPA's AP-42[2] guidance document discusses the application of water as a dust control technique for bulldozer operation, material handling, and general construction activities. However, AP-42 does not include a control level for the use of water to control dust from these construction activities. A review of the Final Best Available Control Measure Technological and Economic Feasibility Analysis

[2] AP-42, Table 13.2.3-2, 1/95.

prepared for the San Joaquin Valley Unified Air Pollution Control District[3] shows a PM_{10} emission control level of approximately 78% for scraper excavation and unloading activities when water application is used as the control measure. Since soil excavation using a scraper is similar to soil excavation using a bulldozer or a motor grader, it is reasonable to use the scraper dust control level for these activities as well. In addition, the 78% PM_{10} control level should be used in the WEC construction impact analysis for scraper excavation activities. Furthermore, because soil unloading by a scraper is similar to soil unloading by a dump truck, it is reasonable to use the scraper dust control level of 78% in the WEC construction analysis for dump truck unloading activities. Consequently, the WEC construction impact analysis has been revised to use the 78% PM_{10} emission control level for scraper excavation, bulldozer, motor grader, and dump truck unloading operations. A copy of the revised WEC construction analysis (formerly included as Appendix 8,1D of the AFC) is included as Attachment AQ-105.

For wind erosion, while EPA's AP-42[4] guidance document discusses the application of water as a control technique for wind erosion, AP-42 does not include a method to calculate wind erosion dust control efficiency associated with the use of water. Therefore, the unpaved road dust control efficiency of 88% was used for wind erosion as well. A review of a technical paper authored by Dennis R. Fitz[5] shows that based on ambient sampling, a PM_{10} wind erosion control efficiency of approximately 90% is possible with a properly implemented water application program. This control level is similar to the 88% level of PM_{10} control for wind erosion assumed for the construction analysis for the WEC project. Consequently, this level of PM_{10} control is reasonable for wind erosion.

Regarding dust control during loader excavation, once again AP-42[6] discusses watering as a control technique for excavation activities but does not include a method for calculating control efficiencies. EPA's "Control of Open Fugitive Dust Sources" document discusses particulate control levels of 81% associated with the use of water to control material handling dust emissions[7]. This control level is similar to the 78% PM_{10} control level discussed above for scraper excavation. Consequently, the revised WEC construction impact analysis uses the 78% PM_{10} emission control level for loader excavation activities. A copy of the revised WEC construction analysis is included as Attachment AQ-105.

[3] Final BACM Technological and Economic Feasibility Analysis prepared for San Joaquin Valley Air Pollution Control District, prepared by Sierra Research, Inc., March 21, 2003, Control Measure 4i.
[4] AP-42, Section 13.2.4, 1/95.
[5] Dennis R. Fitz, Evaluation of Watering to Control Dust in High Winds, Journal of the Air and Waste Management Association, April 2000.
[6] AP-42, Section 13.2.3, Table 13.2.3-2, 1/95.
[7] EPA, Control of Open Fugitive Dust Sources, September 1988, page 5-18.

106. The unpaved road fugitive dust control efficiency calculation assumes that the unpaved roads will be watered every 15 minutes. This frequency seems overly optimistic. Can the Applicant guarantee this application frequency and agree by permit condition to be limited to this frequency of watering? If not, please revise the unpaved road dust suppression control efficiency using a more reasonable application frequency.

Response: As discussed in Data Response #107, based on a closer examination of the traffic level estimate for the construction site, a more reasonable water frequency is approximately once an hour.

107. The unpaved road fugitive dust control efficiency calculation uses an annual evaporation assumption of 65 inches. However, the annual evaporation at the project site is properly categorized as 80 to 85 inches (Figure 13.2.2-2 of AP-42 Section 13.2.2). Please revise this calculation to use a site specific evaporation rate.

Response: An evaporation rate of 70 inches per year was used for the construction impact analysis for the WEC project, and not the 65 inches per year discussed in the CEC comment. This evaporation rate of 70 inches per year was used in the WEC construction analysis to calculate the dust control efficiency associated with water application. This evaporation rate was determined by reviewing a mean annual evaporation isopleths figure[8] in EPA's "Control of Open Dust Sources" document. This same figure appears in AP-42 as Figure 13.2.2-2, 9/98. As shown in the attached Figure AQ-107, because of the small scale of this figure, it is difficult to determine if the evaporation rate for the WEC project site is 70, 80, or 90 inches per year. As discussed above, the water application dust control efficiency of 88% used for the WEC project construction analysis was calculated from the following formula found in the EPA's Control of Open Fugitive Dust Sources:

$C = 100 - (0.8*p*d*t)/i$

Where:

C = average dust control efficiency, in percent

p = potential average hourly daytime evaporation rate in mm/hr

d = average hourly daytime traffic rate in vehicles per hour

i = water application intensity in L/m2

t = time between water application in hours

For the construction analysis for the WEC project, the 88% dust control associated with water application was based on an evaporation rate of 70 inches/yr, a water application intensity of 0.7 L/m2, an average hourly traffic rate of 100 vehicles per hour, and a time between water application of 0.25 hours. After a closer review of these assumptions, the traffic rate and time between water application stand out as

[8] EPA, Control of Open Fugitive Dust Sources, September 1988, Figure 5-1.

questionable. Other than when the approximately 200 construction worker vehicles arrive and leave the construction site at the beginning and end of each workday, during the peak month there are only approximately 25 pieces of mobile construction equipment working at the construction site at any one time. Therefore, it is unreasonable to assume that the average hourly daytime traffic level is 100 vehicles per hour over all of the active construction site. A more reasonable daily average would be closer to approximately 25 to 50 vehicles per hour. With respect to the time between water application rates, a more reasonable time would be one hour between water application at active areas of the construction site. The water application intensity of 0.7 L/m2 was taken from an example calculation in the EPA Control of Open Fugitive Dust Sources document.[9] A review of the Air & Waste Management Association's Air Pollution Engineering Manual[10] discusses the use of water application to control fugitive dust generated by travel on unpaved roads. According to this document, typical water application rates range from 0.3 to 0.5 gallons per square yard (1.36 to 2.26 L/m2). This water application rate is significantly higher than the level assumed for the WEC construction analysis. Table AQ107-1 shows how the calculated dust control level for water application varies with changes to these input assumptions.

As shown in Table AQ107-1, for 25 to 50 vehicles per hour, given the potential variability in the water application rate and evaporation rate, the effectiveness of watering ranges between 67% and 96%. Therefore, the 88% average dust control associated with the use of water application assumed for the WEC construction analysis is not unreasonable compared to the range of control efficiencies calculated using various evaporation rates, water application rates, and traffic levels.

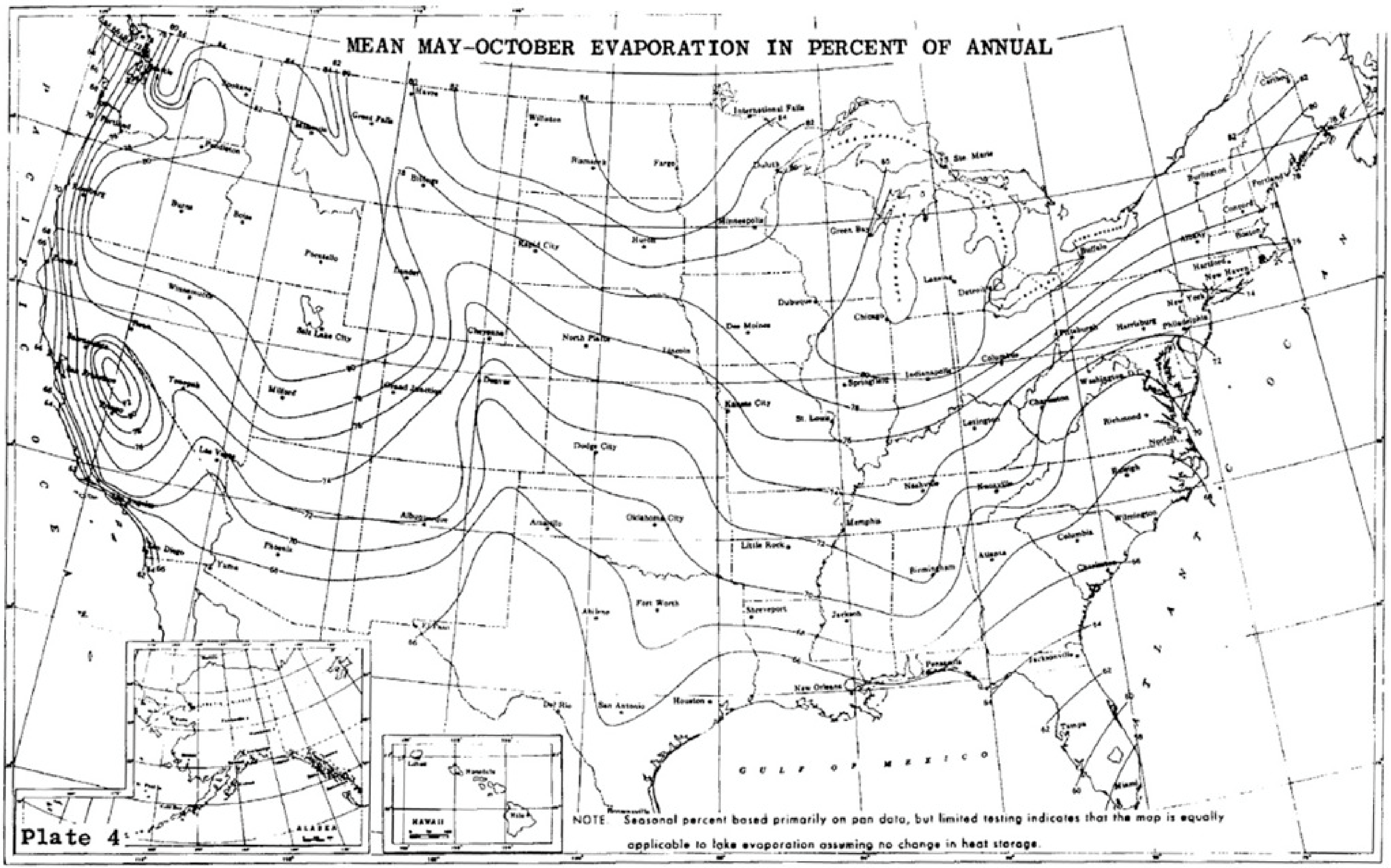
[9] EPA, Control of Open Fugitive Dust Sources, September 1988, page 3-23.
[10] Air & Waste Management Association, Air Pollution Engineering Manual, Second Edition, 2000, page 722.

TABLE AQ107-1
Dust Control Efficiency Associated with Water Application

Traffic Level (vehicles/hr)	Water Application Rate of 0.7 L/m2	Water Application Rate of 1.36 L/m2	Water Application Rate of 2.26 L/m2
Evaporation Rate of 70 Inches/yr, 1-hr Between Water Application			
25	87%	93%	96%
50	74%	87%	92%
75	61%	80%	88%
100	50%	73%	84%
Evaporation Rate of 80 Inches/yr, 1-hr Between Water Application			
25	85%	92%	95%
50	72%	85%	91%
75	57%	77%	86%
100	43%	69%	82%
Evaporation Rate of 90 Inches/yr, 1-hr Between Water Application			
25	83%	91%	95%
50	67%	83%	90%
75	50%	74%	85%
100	33%	66%	79%

WALNUT ENERGY CENTER
(02-AFC-4)
DATA RESPONSES, SET 2A

Figure AQ107-1
Geographical Distribution of the Percentage of Evaporation Occurring Between May and October



108. The uncontrolled soil moisture content used in several of the fugitive dust emission factor equations is 7.9%. This value seems high prior to wet suppression. The EPA Section 13.2.4 provides a moisture content of 3.4% for exposed ground. The SCAQMD CEQA Air Quality Handbook (Table 9-9-G-1) provides a soil moisture content of 2% for dry soils. Staff is concerned that the Applicant is double counting the wet suppression dust control through the use of unrealistically high uncontrolled soil moisture contents. Please provide a site specific reference for the soil moisture content assumption, or recalculate the fugitive dust emission factors for all applicable sources (i.e. sources with emission calculations that use soil moisture content) using an uncontrolled moisture content of 3.4%.

Response: In the construction impact analysis for the WEC project, the bulldozer operation, material unloading, and unpaved road travel particulate emission factors were based on a soil moisture content of 7.9%. This soil moisture content is a default factor found in AP-42.[11] Because soil moisture contents can vary significantly depending on factors such as project location, soil type, ambient temperature, relative humidity, rainfall, and water application rates, it is difficult to accurately determine the soil moisture content for a specific project. For example, the test data reviewed by the EPA to develop the unpaved road travel emission factor equation shows soil moisture contents ranging from 0.03% to 20%.[12] While the default moisture content of 7.9% used for the WEC construction analysis is believed to be appropriate considering the various factors affecting this value, since we do not have site specific soil moisture data for the WEC project site, we have revised the WEC construction impact analysis using the CEC Staff's recommended soil moisture content of 3.4%. A copy of the revised WEC construction impact analysis is included as Attachment AQ-105.

BACKGROUND

Construction Modeling Results

Staff reviewed the air quality modeling files created by Sierra Research, Nov. 19, 2002. The project impacts modeling files (TURL_03, TURL_06A/B/C, and TURL_07) were reviewed and the results were compared with the refined modeling results presented in Table 8.1B-9. The maximum impacts modeled (Max $\mu g/m^3$) for the fire pump and the combined or "all" case (1-hr, 3-hr, 8-hr, 24-hr, and annual) could not be verified. Staff requires additional information to verify the modeling results.

DATA REQUEST

109. Please provide detailed calculations, based on the modeling files provided, to show how the modeling results presented in Table 8.1B-9 for the fire pump and combined or "all" cases were derived (1-hr, 3-hr, 8-hr, 24-hr, and annual).

[11] AP-42, Section 11.9, Western Surface Coal Mining, Table 11.9-3, overburden, 1/95.
[12] AP-42, Section 13.2.2, Table 13.2.2-3, 9/98.

Response: The Applicant inadvertently provided the wrong project modeling files for the fire pump engine. The revised modeling files are included on the attached compact disks labeled "Revised Project and Construction Emissions Modeling Analysis."

Additionally, we have corrected an error in the emission rates used in the modeling analysis for the fire pump engine. The original modeling used emissions rates for the 3-hour, 8-hour, and 24-hour impacts based on the maximum operation of the engine for the entire modeling period. The revised emission rates are based on the assumptions listed in Table 8.1B-4; that is, 1-hour of engine operation during the relevant modeling time period (except for annual emissions, which are based on 100 hours of engine operation). The attached modeling files reflect the corrected emission rates, and the attached Tables 8.1B-9 and 8.1-24 (see Attachment AQ-109) have been revised from those included in the AFC to reflect the corrected modeling results for the project.

BACKGROUND

Construction Modeling Results

In the AFC, Appendix 8.1D, Section 8.1D.5.1, the Applicant states that the worst-case daily and annual onsite construction emission levels used to determine the construction impacts are provided in Tables 8.1D-1 and 8.1D-2, respectively. Staff reviewed the Applicant's construction impacts modeling input file (TURL_09.DAT). The emissions rates (grams/second) used by the Applicant were modeled based on 12 hours/day for construction equipment exhaust and related dust emissions, and 24 hours/day for windblown dust. Using these input parameters, Staff calculated the modeled lb/day and tons/year and compared the results with those presented in Tables 8.1D-1 and 8.1D-2. Staff's calculated results were consistently higher than the Applicant's stated emissions levels (Tables 8.1D-1 and 8.1D-2) using the assumption of 12 hr/day and 365 days/year. However when Staff assumed 10 hr/day and 250 days/year (5 days/week minus two weeks vacation), the resultant emissions were the same as the Applicant's emissions levels as provided in the Tables 8.1D-1 and 8.1D-2. The point of this exercise is that there are significant inconsistencies in the emission calculations versus the modeling inputs that translate to inaccurate impacts assessment.

Additionally, Staff anticipates that it will remodel the construction emissions using point sources for the construction equipment exhausts and volume sources for the fugitive dust emissions and recommends that the Applicant does the same. This recommendation considers the fact that the Applicant's emissions data provides an active construction area of 819,927 square feet, while the modeling files use area sources that have dimensions of over 1,600,000 square feet. Staff is available to discuss appropriate point source and volume source modeling assumptions, if needed.

DATA REQUESTS

110. Please verify the basis for the worst-case daily and annual onsite construction emission levels (emissions rates, hours/day, days/year). Update the modeling input and output files and Tables 8.1D-1 and 8.1D-2, as necessary.

Response: The Applicant has revised the construction modeling files to indicate that emissions from equipment operations are spread over 12 hours per day, 250 days per year, and that windblown dust is generated 24 hours per day, 365 days per year. The following is an example of how the annual average emission rate for NOx from construction equipment is calculated:

10.42 tons/yr NOx (Table 8.1D-2) / 250 days/yr / 12 hours/day x 2000 lb/ton

= 6.95 lb/hr NOx

= 0.876 g/sec NOx, annual average

This annual average construction equipment emission rate is then modeled assuming the equipment operates for 12 hours per day, 250 days per year (no operation in the nighttime or on weekends).

Previously, the construction modeling analysis erroneously applied the 12-hour, 250-day annual emission factors for 365 days per year instead of 250 days per year as described above. This resulted in erroneously high annual equipment emissions being used in the construction modeling analysis. We have revised the construction modeling files to correct this error. The revised modeling files are included on the attached compact disks labeled "Revised Project and Construction Emissions Modeling Analysis."

Additionally, we note that only part of the construction area will generate windblown dust because other parts of the area will be covered by gravel. Therefore, while construction equipment will operate over the entire active construction and lay down areas, only part of this area will actually generate windblown dust.

Finally, it is unclear how the Staff will model a moving point source. Additional information is required in order to comment on this proposal.

ATTACHMENT AQ-105

REVISED CONSTRUCTION IMPACT ANALYSIS

APPENDIX 8.1D

CONSTRUCTION PHASE IMPACTS

(Revised 4/8/03)

The analysis of the air quality impacts associated with the construction of the proposed Project has been revised as follows:

- Based on recent data requests by the CEC staff, the soil moisture content used in the development of many of the construction dust PM_{10} emission factors has been reduced from 7.9% to 3.4% wt.
- Based on recent data requests by the CEC staff, the PM_{10} emission control levels assumed for the application of water were reviewed in an effort to better match dust control levels with specific construction activities. As a result of this review, the PM_{10} emission control level for water application has been reduced from approximately 88% to approximately 78% for bulldozer excavation, loader excavation, and motor grader excavation activities. In addition, based on this review the PM_{10} emission control level for water application was increased from zero to 78% for scraper excavation and dump truck unloading operations.
- Based on recent data requests by the CEC staff, the air dispersion modeling assumptions were reviewed to ensure that the 250 day per year active construction period assumed for purposes of estimating annual average construction emissions for the WEC project was reflected in the modeling analysis. Based on this review, the number of days modeled with active construction emissions was reduced from 365 days to 250 days per year.

8.1D.1 Onsite Construction

Construction of the Project is expected to last approximately 22 months. The onsite construction will be performed in the following five main phases:

- Site preparation;
- Foundation work;
- Installation of major equipment;
- Construction/installation of major structures; and
- Start up and commissioning.

Site preparation includes clearing, grading, excavation of footings and foundations, and backfilling operations. After site preparation is finished, the construction of the foundations and structures is expected to begin. Once the foundations and structures are finished, installation and assembly of the mechanical and electrical equipment are scheduled to commence.

Fugitive dust emissions from the construction of the Project will result from:

- Dust entrained during site preparation and grading/excavation at the construction site;

- Dust entrained during onsite travel on paved and unpaved surfaces;
- Dust entrained during aggregate and soil loading and unloading operations; and
- Wind erosion of areas disturbed during construction activities.

Combustion emissions during construction will result from:

- Exhaust from the Diesel construction equipment used for site preparation, grading, excavation, and construction of onsite structures;
- Exhaust from water trucks used to control construction dust emissions;
- Exhaust from Diesel-powered welding machines, electric generators, air compressors, water pumps, etc.;
- Exhaust from Diesel trucks used to deliver concrete, fuel, and construction supplies to the construction site; and
- Exhaust from automobiles and trucks used by workers to commute to the construction site.

To determine the potential worst-case daily construction impacts, exhaust and dust emission rates have been evaluated for each source of emissions. Worst-case daily dust and exhaust emissions are expected to occur during month seven of the construction schedule. Annual emissions are based on the average equipment mix during the 22-month construction period.

8.1D.2 Natural Gas/Wastewater Pipelines and Transmission Lines

The installation of a 3.2-mile long natural gas pipeline will generate short-term construction impacts including fugitive dust and construction equipment combustion emissions. For this pipeline route, the excavation, installation of pipe, backfilling, and site cleanup will be performed in approximately 500-foot-long sections over a short duration to minimize fugitive dust and construction equipment combustion emissions.

The installation of the water pipeline will also generate short-term construction impacts including fugitive dust and construction equipment combustion emissions.

The proposed project also includes the installation of a 0.5-mile long transmission line interconnect. As with the construction of the natural gas and water pipelines, this construction activity will result in fugitive dust and construction equipment combustion emissions.

8.1D.3 Available Mitigation Measures

The following mitigation measures are proposed to control exhaust emissions from the Diesel heavy equipment used during construction of the Project:

- Operational measures, such as limiting engine idling time and shutting down equipment when not in use;
- Regular preventive maintenance to prevent emission increases due to engine problems;
- Use of low sulfur and low aromatic fuel meeting California standards for motor vehicle Diesel fuel; and

- Use of low-emitting Diesel engines meeting federal emissions standards for construction equipment if available.

The following mitigation measures are proposed to control fugitive dust emissions during construction of the project:

- Use either water application or chemical dust suppressant application to control dust emissions from unpaved surface travel and unpaved parking areas;
- Use vacuum sweeping and/or water flushing of paved road surface to remove buildup of loose material to control dust emissions from travel on the paved access road (including adjacent public streets impacted by construction activities) and paved parking areas;
- Cover all trucks hauling soil, sand, and other loose materials, or require all trucks to maintain at least two feet of freeboard;
- Limit traffic speeds on unpaved surfaces to 25 mph;
- Install sandbags or other erosion control measures to prevent silt runoff to roadways;
- Re-plant vegetation in disturbed areas as quickly as possible;
- As needed, use gravel pads along with wheel washers or wash tires of all trucks exiting construction site that carry track-out dirt from unpaved surfaces; and
- Mitigate fugitive dust emissions from wind erosion of areas disturbed from construction activities (including storage piles) by application of either water or chemical dust suppressant and/or use of wind breaks.

8.1D.4 Estimation of Emissions with Mitigation Measures

8.1D.4.1 Onsite Construction

Tables 8.1D-1 and 8.1D-2 show the estimated maximum daily and annual heavy equipment exhaust and fugitive dust emissions with recommended mitigation measures for onsite construction activities. Detailed emission calculations are included as Attachment 8.1D-1.

8.1D.4.2 Pipeline/Transmission Line Construction

Table 8.1D-3 shows the estimated maximum daily heavy equipment exhaust and fugitive dust emissions with recommended mitigation measures for the natural gas pipeline, water pipeline, and transmission line interconnect construction activities. The following is the expected construction period for each pipeline/transmission line route:

- Natural gas pipeline – 12 months
- Water pipeline – 12 months
- Transmission line interconnect – 1 month

Because of the temporary nature of these construction activities, annual emissions are not shown in the following emission summary tables for these construction activities. Detailed emission calculations are included as Attachment 8.1D-1.

Table 8.1D-1 (Revised 4/8/03)
Maximum Daily Emissions During Onsite Construction
(Month 7; Maximum Dust Emissions), Pounds Per Day

	NO_x	CO	POC	SO_x	PM_{10}
Onsite					
Construction Equipment	136.13	64.92	10.69	0.12	6.36
Fugitive Dust	--	--	--	--	~~28.58~~ 32.26
Offsite					
Worker Travel, Truck Deliveries	51.32	391.38	32.03	0.83	1.79
Total Emissions					
Total	187.45	456.30	42.72	0.95	~~36.72~~ 40.41

Table 8.1D-2 (Revised 4/8/03)
Annual Emissions During Onsite Construction, Tons Per Year

	NO_x	CO	VOC	SO_x	PM_{10}
Onsite					
Construction Equipment	10.42	7.26	1.10	0.01	0.67
Fugitive Dust	--	--	--	--	~~0.96~~ 1.08
Offsite					
Worker Travel, Truck Deliveries	6.51	48.98	4.01	0.11	0.23
Total Emissions					
Total	16.93	56.25	5.11	0.12	~~1.86~~ 1.98

Table 8.1D-3
Maximum Daily Emissions During Pipeline/Transmission Line Interconnect Construction
Pounds Per Day

	NO_x	CO	VOC	SO_x	PM_{10}
Natural Gas Pipeline					
Onsite					
Construction Equipment	55.81	17.93	4.14	1.89	2.77
Fugitive Dust	--	--	--	--	4.66
Offsite					
Truck Deliveries and Worker Travel	22.27	55.99	5.21	0.77	1.12
Total Emissions	78.08	73.92	9.35	2.66	8.55
Water Pipeline					
Onsite					
Construction Equipment	61.98	22.61	4.85	2.22	3.17
Fugitive Dust	--	--	--	--	5.47
Offsite					
Truck Deliveries and Worker Travel	31.55	61.80	6.04	1.15	1.64
Total Emissions	93.53	84.41	10.89	3.37	10.28
Transmission Line Interconnect					
Onsite					
Construction Equipment	76.13	15.58	4.83	2.20	3.47
Fugitive Dust	--	--	--	--	1.14
Offsite					
Truck Deliveries and Worker Travel	49.49	66.01	7.12	1.92	2.67
Total Emissions	125.62	81.59	11.95	4.12	7.28

8.1D.5 Analysis of Ambient Impacts from Onsite Construction

Ambient air quality impacts from emissions during construction of the Project were estimated using an air quality dispersion modeling analysis. The modeling analysis considers the construction site location, the surrounding topography, and the sources of emissions during construction, including vehicle and equipment exhaust emissions and fugitive dust.

8.1D.5.1 Dispersion Model

As in the analysis of project operating impacts, the EPA-approved Industrial Source Complex Short Term (ISCST3) model was used to estimate ambient impacts from construction activities. A detailed discussion of the ISCST3 dispersion model is included in Section 8.1.5.

The emission sources for the construction site were grouped into two categories: exhaust emissions and dust emissions. An effective emission plume height of 4.15 meters was used for all exhaust emissions.[1] For construction dust emissions, an effective plume height of 0.5 meters was used in the modeling analysis. The exhaust and dust emissions were modeled as area sources that covered the total area of the construction site. The construction impacts modeling analysis used the same receptor locations as used for the project operating impact analysis. A detailed discussion of the receptor locations is included in Section 8.1.5 of the AFC.

To determine the construction impacts on short-term ambient standards (24 hours and less), the worst-case daily onsite construction emission levels shown in Table 8.1D-1 were used. For pollutants with annual average ambient standards, the annual onsite emission levels shown in Table 8.1D-2 were used. The same meteorological data set and background ambient levels used for the project operating modeling analysis was used for the construction emission impacts analysis.

8.1D.5.2 Modeling Results

Based on the emission rates of NO_x, SO_2, CO, and PM_{10} and the meteorological data, the ISCST3 model calculates hourly and annual ambient impacts for each pollutant. As mentioned above, the modeled 1-hour, 3-hour, 8-hour, and 24-hour ambient impacts are based on the worst-case daily emission rates of NO_x, SO_2, CO, and PM_{10}. The annual impacts are based on the annual emission rates of these pollutants.

The one-hour and annual average concentrations of NO_2 were computed following the revised EPA guidance for computing these concentrations (August 9, 1995 *Federal Register,* 60 FR 40465). The OLM_ISC model was used for the one-hour average NO_2 impacts. The annual average was calculated using the ambient ratio method (ARM) with the EPA default value of 0.75 for the annual average NO_2/NO_x ratio.

The modeling analysis results are shown in Table 8.1D-4. Also included in the table are the maximum background levels that have occurred during the past few years and the resulting total ambient impacts. As shown in Table 8.1D-4, construction impacts alone for all modeled pollutants are expected to be below the most stringent state and national standards. With the exception of 24-hour and annual PM_{10} impacts, construction activities are not expected to cause the violation of any state or federal ambient air quality standard. However, the state 24-hour and annual average PM_{10} standards are exceeded in the absence of the construction emissions for the Project.

[1] This release height is based on the data used in ARB's Diesel Risk Reduction Plan for Diesel vehicles.

Table 8.1D-4 (Revised 4/8/03)

Modeled Maximum Construction Impacts

Pollutant	Averaging Time	Maximum Construction Impacts (μg/m³)	Background (μg/m³)	Total Impact (μg/m³)	State Standard (μg/m³)	Federal Standard (μg/m³)
NO_2[a]	1-Hour	147	181	328	470	--
	Annual	~~14.7~~ 10.5	35.8	~~50.5~~ 46.3	--	100
SO_2	1-Hour	0.3	76.0	76.3	650	--
	3-Hour	0.3	52.4	52.7	--	1300
	24-Hour	0.1	23.6	23.7	109	365
	Annual	0.01	5.2	5.2	--	80
CO	1-Hour	164	5,730	5,894	23,000	40,000
	8-Hour	60	4,206	4,266	10,000	10,000
PM_{10}	24-Hour	~~42~~ 46	157	~~199~~ 203	50	150
	Annual[b]	~~3.6~~ 2.9	33	~~37~~ 36	30	--
	Annual[c]	~~3.6~~ 2.9	45.9	~~49.5~~ 49	20[d]	50

Notes:

a. OLM_ISC used for 1-hr average impact and ARM applied for annual average, using EPA default ratio of 0.75.
b. Annual Geometric Mean.
c. Annual Arithmetic Mean.
d. New state PM_{10} standard approved but not yet effective.

The dust mitigation measures already proposed by the applicant are expected to be very effective in minimizing fugitive dust emissions. The attached isopleth diagrams show the extent of the modeled impacts from construction PM_{10} for the 24-hour and annual averaging periods. As shown on these isopleths, while maximum impacts occur next to the project site fenceline, concentrations decrease rapidly at locations only a couple of hundred meters away from the project site. For example, as shown on the isopleths for 24-hr average PM_{10} impacts, along the fenceline PM_{10} impacts are approximately ~~100~~40 μg/m³. However, at locations only 200 meters away from the fenceline PM_{10} impacts decrease to approximately ~~20~~ 10 μg/m³ (only ~~20~~25% of the level at the fenceline).

It is also important to note that emissions in an exhaust plume are dispersed through the entrainment of ambient air, which dilutes the concentration of the emissions as they are carried away from the source by winds. The process of mixing the pollutants with greater and greater volumes of cleaner air is controlled primarily by the turbulence in the atmosphere. This dispersion occurs both horizontally, as the exhaust plume rises above the emission point, and vertically, as winds carry the plume horizontally away from its source.

The rise of a plume above its initial point of release is a significant contributing factor to the reductions in ground-level concentrations, both because a rising plume entrains more ambient air as it travels downwind, and because it travels farther downwind (and thus also undergoes more horizontal dispersion) before it impacts the ground. Vertical plume rise occurs as a result of buoyancy (plume is hotter than ambient air, and hot air, being less dense, tends to rise) and/or momentum (plume has an initial vertical velocity).

In ISCST3, area sources are not considered to have either buoyant or momentum plume rise, and therefore the model assumes that there is no vertical dispersion taking place. Thus a significant source of plume dilution is ignored when sources are modeled as area sources in ISCST3.

The project construction site impacts are not unusual in comparison to most construction sites; construction sites that use good dust suppression techniques and low-emitting vehicles typically do not cause violations of air quality standards. The input and output modeling files are being provided electronically.

8.1D.5.3 Health Risk from Diesel Exhaust

The combustion portion of annual PM_{10} emissions from Table 8.1D-2 above were modeled separately to determine the annual average Diesel PM_{10} exhaust concentration. This was used with the ARB-approved unit risk value of 300 in one million for a 70-year lifetime to determine the potential carcinogenic risk from Diesel exhaust during construction. The exposure was also adjusted by a factor of 2/70, or 0.0286, to correct for the 24-month exposure during the construction period.

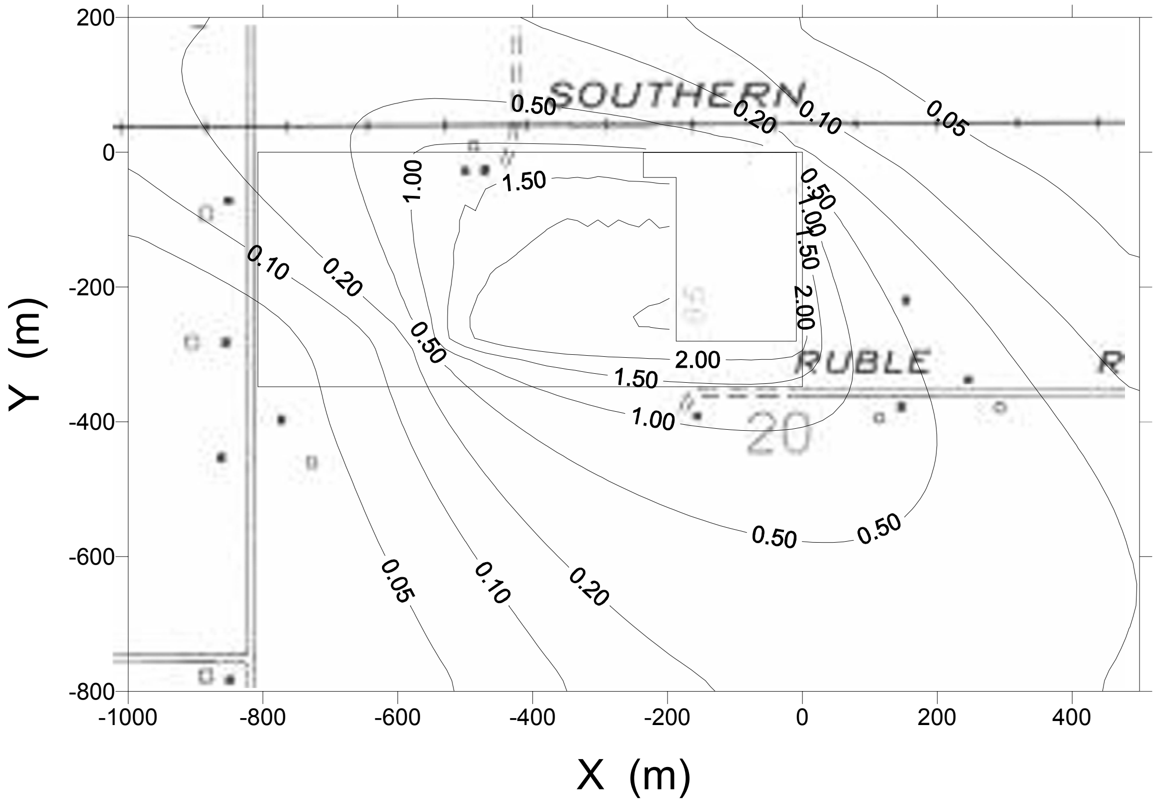
The maximum modeled annual average concentration of Diesel exhaust PM_{10} is ~~2.41~~ 0.67 ug/m^3. Using the unit risk value and adjustment factors described above, the carcinogenic risk due to exposure to Diesel exhaust during construction activities is expected to be approximately ~~21~~5.8 in one million. This is ~~above~~ below ~~-~~the 10 in one million level considered to be significant under the San Joaquin Valley APCD's CEQA guidelines.

~~Howevert~~These impacts are highly localized near the project site and are much lower at the nearest residences, which are approximately 200 meters away. At the nearest residence the annual average concentration of Diesel exhaust PM_{10} is 0.18 ug/m^3 resulting in a carcinogenic risk of approximately 1.5 in one million. As shown in the attached annual average Diesel combustion PM_{10} isopleth diagram, the ~~area in which the risk may exceed 10 in one million (i.e., ambient annual average Diesel PM_{10} impact equal to or greater than 1.2 ug/m^3) extends less than 100 meters from the facility fenceline. The~~ area in which the risk may exceed 1 in one million (Diesel PM_{10} impact equal to or greater than 0.12 ug/m^3) extends about ~~700~~ 400 meters from the ~~southwest~~ facility fenceline. This analysis remains conservative because, as discussed above, the modeled PM_{10} concentrations from construction operations are overpredicted by the ISCST3 model.

8.1D.5.4 Analysis of Ambient Impacts from Pipeline/Transmission Line Interconnect Construction

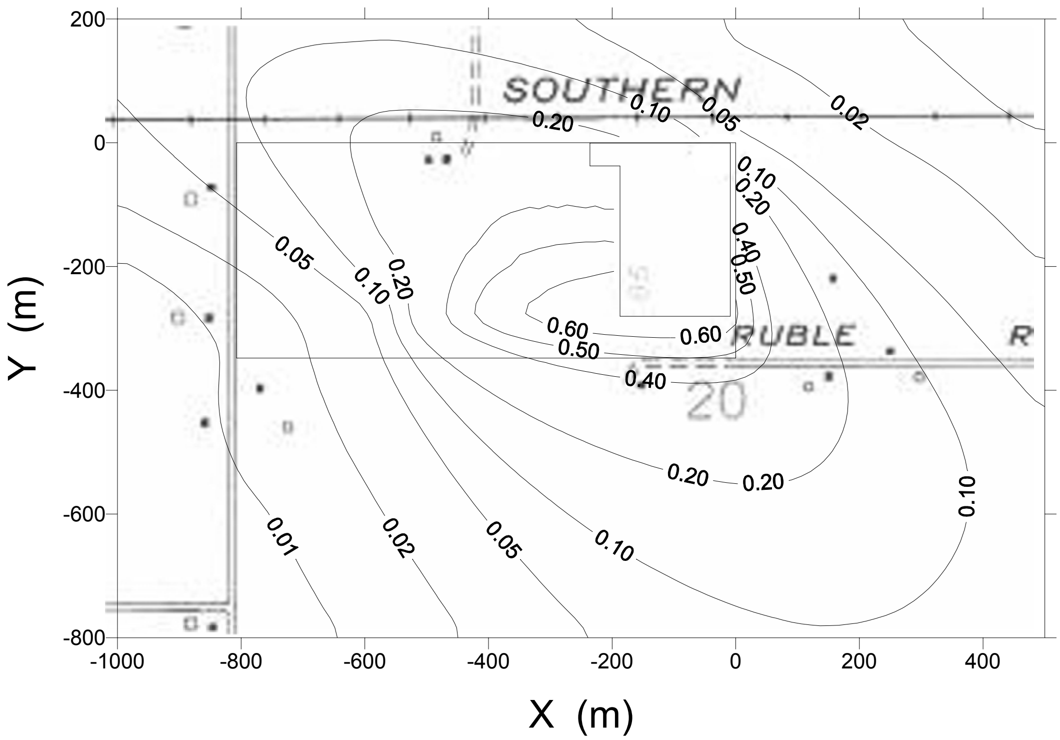
Construction of the natural gas/wastewater pipelines and the transmission line interconnect activities will be of short duration, will require minimal equipment, and will generally occur along public roads and utility rights-of-way covering a large geographical area. Therefore, the potential ambient air quality impacts associated with these construction projects are expected to be minimal.

Turlock ID Construction: Annual PM10 - ug/m3



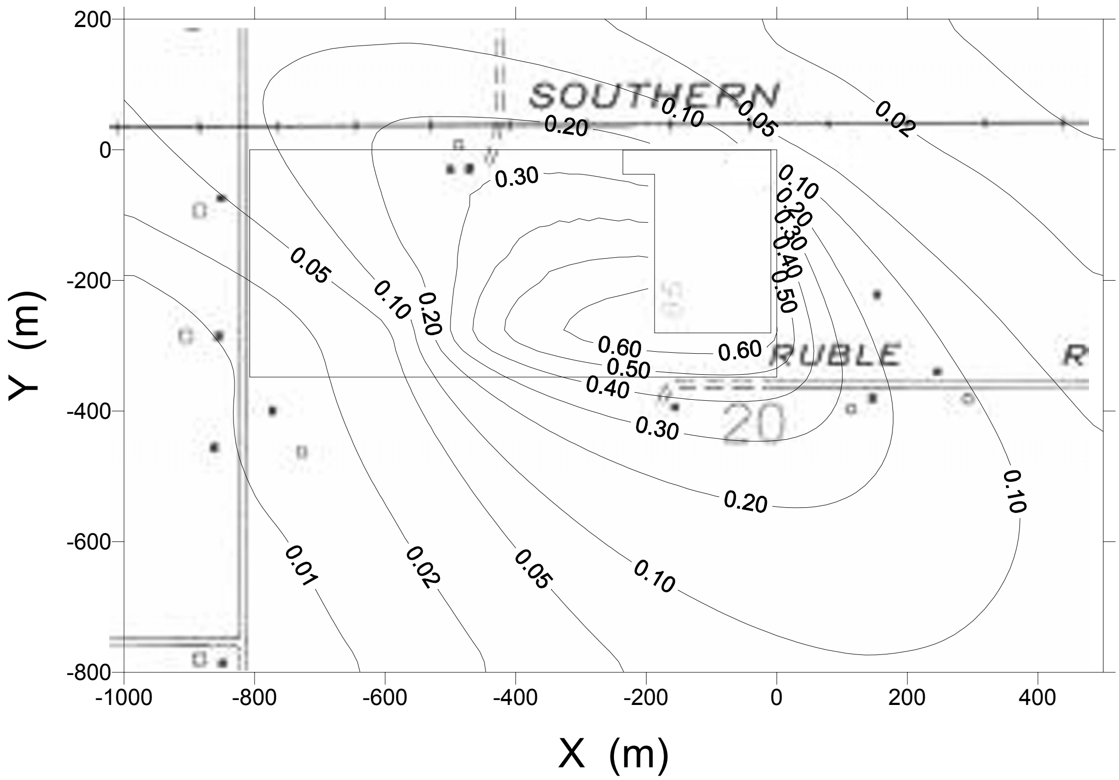
APPENDIX 8.1D
REVISED APRL 10, 2003

Turlock ID Construction: Annual Combustion PM10 - ug/m3



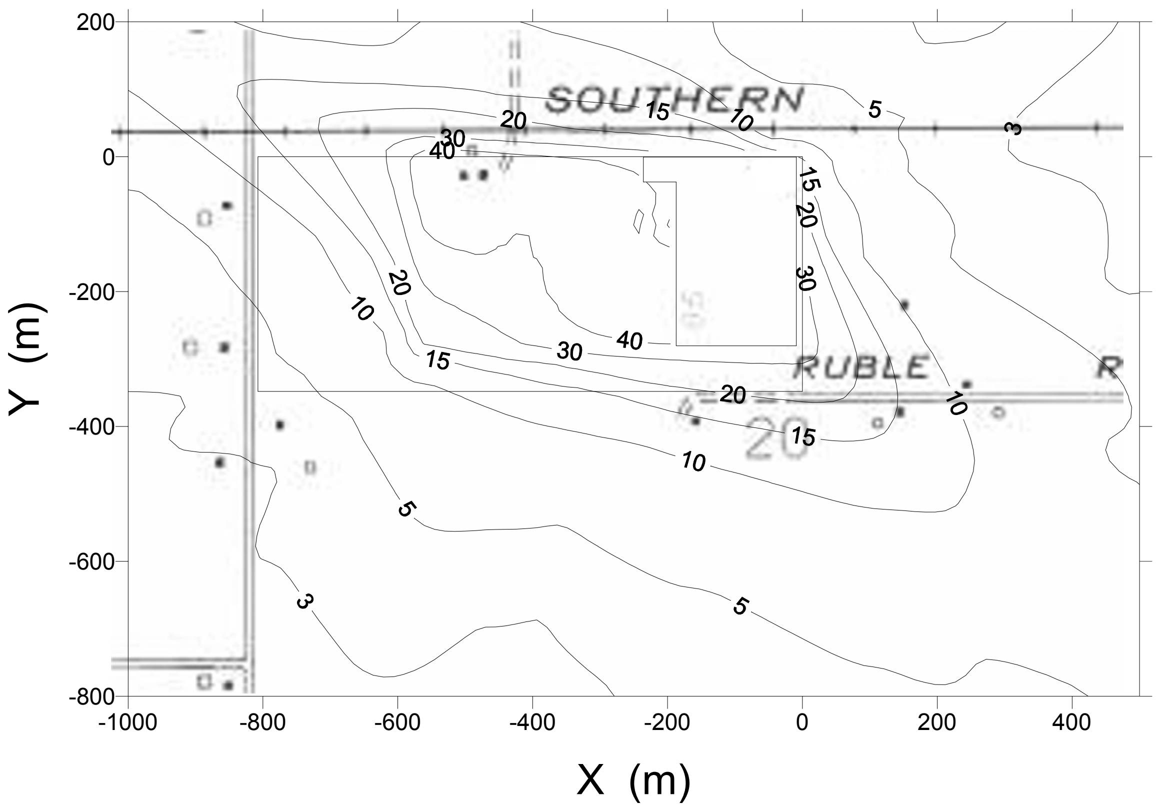
APPENDIX 8.1D
REVISED APRL 10, 2003

Turlock ID Construction: Annual Diesel PM10 - ug/m3



APPENDIX 8.1D
REVISED APRL 10, 2003

Turlock ID Construction: 24-hr PM10 - ug/m3



ATTACHMENT 8.1D-1
DETAILED CONSTRUCTION EMISSIONS CALCULATIONS

Construction Equipment Annual Exhaust Emissions
Walnut Energy Center Project

Equipment	Gasoline/ Diesel	Average Number of Units Per Year(1)	Average Operating Hrs/Day Per Unit	Gals/Hr Per Unit	Average Operating Days per Year	Total Fuel Use (Gals/yr)	Emission Factors (lbs/1000 gals)(2)					Annual Emissions (tons/yr)				
							NOx	CO	POC	SOx	PM10	NOx	CO	POC	SOx	PM10
Crawler Crane- Greater than 300 ton	D	0.41	2	7.50	250	1,534	270.01	39.13	15.65	0.21	11.74	0.21	0.03	0.01	0.00	0.01
Crawler Crane- Greater than 200 ton	D	1.05	4	5.00	250	5,227	270.01	39.13	15.65	0.21	11.74	0.71	0.10	0.04	0.00	0.03
Crane - Mobile 65 ton	D	0.91	4	4.00	250	3,636	270.01	39.13	15.65	0.21	11.74	0.49	0.07	0.03	0.00	0.02
Cranes -Mobile 45 ton	D	0.50	4	4.00	250	2,000	270.01	39.13	15.65	0.21	11.74	0.27	0.04	0.02	0.00	0.01
Cranes - Mobile 35 ton	D	0.95	4	4.00	250	3,818	270.01	39.13	15.65	0.21	11.74	0.52	0.07	0.03	0.00	0.02
Bulldozer D6H	D	0.14	8	5.50	250	1,500	270.01	39.13	15.65	0.21	11.74	0.20	0.03	0.01	0.00	0.01
Bulldozer D4C	D	0.18	8	3.00	250	1,091	270.01	39.13	15.65	0.21	11.74	0.15	0.02	0.01	0.00	0.01
Excavator- Trencher	D	0.27	8	2.00	250	1,091	270.01	39.13	15.65	0.21	11.74	0.15	0.02	0.01	0.00	0.01
Excavator- Earth Scraper	D	0.14	8	9.00	250	2,455	270.01	39.13	15.65	0.21	11.74	0.33	0.05	0.02	0.00	0.01
Excavator-Motor Grader	D	0.32	8	5.00	250	3,182	270.01	39.13	15.65	0.21	11.74	0.43	0.06	0.02	0.00	0.02
Excavator- Backhoe/loader	D	0.73	8	2.50	250	3,636	270.01	39.13	15.65	0.21	11.74	0.49	0.07	0.03	0.00	0.02
Excavator - loader	D	0.18	8	2.50	250	909	270.01	39.13	15.65	0.21	11.74	0.12	0.02	0.01	0.00	0.01
Vibratory Roller	D	0.36	8	10.00	250	7,273	270.01	39.13	15.65	0.21	11.74	0.98	0.14	0.06	0.00	0.04
Portable Compaction roller	D	0.36	8	10.00	250	7,273	270.01	39.13	15.65	0.21	11.74	0.98	0.14	0.06	0.00	0.04
Truck- Water	D	0.73	8	3.13	250	4,553	170.68	106.79	15.33	0.21	9.59	0.39	0.24	0.03	0.00	0.02
Forklift	D	1.00	4	2.50	250	2,500	270.01	39.13	15.65	0.21	11.74	0.34	0.05	0.02	0.00	0.01
Dump Truck	D	0.27	8	3.13	250	1,707	170.68	106.79	15.33	0.21	9.59	0.15	0.09	0.01	0.00	0.01
Service Truck- 1 ton	D	0.41	8	1.56	250	1,276	74.40	59.47	5.57	0.21	4.83	0.05	0.04	0.00	0.00	0.00
Truck- Fuel/Lube	D	0.77	2	3.13	250	1,209	170.68	106.79	15.33	0.21	9.59	0.10	0.06	0.01	0.00	0.01
Concrete Pumper Truck	D	0.14	8	3.13	250	854	170.68	106.79	15.33	0.21	9.59	0.07	0.05	0.01	0.00	0.00
Tractor Truck 5th Wheel	D	0.82	8	3.13	250	5,122	170.68	106.79	15.33	0.21	9.59	0.44	0.27	0.04	0.00	0.02
Trucks- Pickup 3/4 ton	G	3.73	8	0.78	250	5,815	62.81	677.30	46.28	0.27	1.56	0.18	1.97	0.13	0.00	0.00
Trucks- 3 ton	D	1.82	8	1.56	250	5,673	74.40	59.47	5.57	0.21	4.83	0.21	0.17	0.02	0.00	0.01
Diesel Powered Welder	D	0.91	4	1.27	250	1,155	313.05	195.66	46.96	0.21	39.13	0.18	0.11	0.03	0.00	0.02
Light Plants	D	1.55	8	1.27	250	3,925	313.05	195.66	46.96	0.21	39.13	0.61	0.38	0.09	0.00	0.08
Portable Compaction- Vibratory Plate	D	1.18	8	0.25	250	591	313.05	195.66	46.96	0.21	39.13	0.09	0.06	0.01	0.00	0.01
Portable Compaction- Vibratory Ram	D	1.00	8	0.25	250	500	313.05	195.66	46.96	0.21	39.13	0.08	0.05	0.01	0.00	0.01
Articulating Boom Platforms	D	2.59	8	0.25	250	1,295	313.05	195.66	46.96	0.21	39.13	0.20	0.13	0.03	0.00	0.03
Pumps	G	1.09	8	0.13	250	277	79.44	13813.38	748.58	0.00	2.35	0.01	1.91	0.10	0.00	0.00
Air Compressor 185 CFM	D	0.95	8	1.27	250	2,425	313.05	195.66	46.96	0.21	39.13	0.38	0.24	0.06	0.00	0.05
Air Compressor 750 CFM	D	1.38	8	1.27	250	3,508	313.05	195.66	46.96	0.21	39.13	0.55	0.34	0.08	0.00	0.07
Concrete Vibrators	D	2.14	8	0.25	250	1,068	313.05	195.66	46.96	0.21	39.13	0.17	0.10	0.03	0.00	0.02
Concrete Trowel Machine	D	0.59	0.8	1.27	250	150	313.05	195.66	46.96	0.21	39.13	0.02	0.01	0.00	0.00	0.00
Fusion Welder	D	0.29	8	1.27	250	726	313.05	195.66	46.96	0.21	39.13	0.11	0.07	0.02	0.00	0.01
Portable Power Generators	D	0.14	8	1.27	250	346	313.05	195.66	46.96	0.21	39.13	0.05	0.03	0.01	0.00	0.01
Total												10.42	7.26	1.10	0.01	0.67
Total for Gasoline-Powered Eqt												0.19	3.88	0.24	0.00	0.00
Total for Diesel-Powered Eqt												10.22	3.38	0.86	0.01	0.66

Notes:
(1) Based on average number of units operating over 22 month construction period.
(2) See notes on combustion emissions.

Construction Equipment Daily Exhaust Emissions (Month 7)
Walnut Energy Center Project

Equipment	Gasoline/ Diesel	Number of Units	Hrs/Day Per Unit	Gals/Hr Per Unit	Total Fuel Use (Gals/day)	Emission Factors (lbs/1000 gals)(1) NOx	CO	POC	SOx	PM10	Daily Emissions (lbs/day) NOx	CO	POC	SOx	PM10
Crawler Crane- Greater than 300 ton	D	0	2	7.50	0.00	270.01	39.13	15.65	0.21	11.74	0.00	0.00	0.00	0.00	0.00
Crawler Crane- Greater than 200 ton	D	0	4	5.00	0.00	270.01	39.13	15.65	0.21	11.74	0.00	0.00	0.00	0.00	0.00
Crane - Mobile 65 ton	D	0	4	4.00	0.00	270.01	39.13	15.65	0.21	11.74	0.00	0.00	0.00	0.00	0.00
Cranes -Mobile 45 ton	D	0	4	4.00	0.00	270.01	39.13	15.65	0.21	11.74	0.00	0.00	0.00	0.00	0.00
Cranes - Mobile 35 ton	D	0	4	4.00	0.00	270.01	39.13	15.65	0.21	11.74	0.00	0.00	0.00	0.00	0.00
Bulldozer D6H	D	1	8	5.50	44.00	270.01	39.13	15.65	0.21	11.74	11.88	1.72	0.69	0.01	0.52
Bulldozer D4C	D	1	8	3.00	24.00	270.01	39.13	15.65	0.21	11.74	6.48	0.94	0.38	0.01	0.28
Excavator- Trencher	D	0	8	2.00	0.00	270.01	39.13	15.65	0.21	11.74	0.00	0.00	0.00	0.00	0.00
Excavator- Earth Scraper	D	3	8	9.00	216.00	270.01	39.13	15.65	0.21	11.74	58.32	8.45	3.38	0.05	2.54
Excavator-Motor Grader	D	1	8	5.00	40.00	270.01	39.13	15.65	0.21	11.74	10.80	1.57	0.63	0.01	0.47
Excavator- Backhoe/loader	D	0	8	2.50	0.00	270.01	39.13	15.65	0.21	11.74	0.00	0.00	0.00	0.00	0.00
Excavator - loader	D	1	8	2.50	20.00	270.01	39.13	15.65	0.21	11.74	5.40	0.78	0.31	0.00	0.23
Vibratory Roller	D	1	8	10.00	80.00	270.01	39.13	15.65	0.21	11.74	21.60	3.13	1.25	0.02	0.94
Portable Compaction roller	D	0	8	10.00	0.00	270.01	39.13	15.65	0.21	11.74	0.00	0.00	0.00	0.00	0.00
Truck- Water	D	1	8	3.13	25.04	170.68	106.79	15.33	0.21	9.59	4.27	2.67	0.38	0.01	0.24
Forklift	D	1	4	2.50	10.00	270.01	39.13	15.65	0.21	11.74	2.70	0.39	0.16	0.00	0.12
Dump Truck	D	2	8	3.13	50.08	170.68	106.79	15.33	0.21	9.59	8.55	5.35	0.77	0.01	0.48
Service Truck- 1 ton	D	0	8	1.56	0.00	74.40	59.47	5.57	0.21	4.83	0.00	0.00	0.00	0.00	0.00
Truck- Fuel/Lube	D	1	2	3.13	6.26	170.68	106.79	15.33	0.21	9.59	1.07	0.67	0.10	0.00	0.06
Concrete Pumper Truck	D	0	8	3.13	0.00	170.68	106.79	15.33	0.21	9.59	0.00	0.00	0.00	0.00	0.00
Tractor Truck 5th Wheel	D	0	8	3.13	0.00	170.68	106.79	15.33	0.21	9.59	0.00	0.00	0.00	0.00	0.00
Trucks- Pickup 3/4 ton	G	2	8	0.78	12.48	62.81	677.30	46.28	0.27	1.56	0.78	8.45	0.58	0.00	0.02
Trucks- 3 ton	D	1	8	1.56	12.48	74.40	59.47	5.57	0.21	4.83	0.93	0.74	0.07	0.00	0.06
Diesel Powered Welder	D	0	4	1.27	0.00	313.05	195.66	46.96	0.21	39.13	0.00	0.00	0.00	0.00	0.00
Light Plants	D	0	8	1.27	0.00	313.05	195.66	46.96	0.21	39.13	0.00	0.00	0.00	0.00	0.00
Portable Compaction- Vibratory Plate	D	0	8	0.25	0.00	313.05	195.66	46.96	0.21	39.13	0.00	0.00	0.00	0.00	0.00
Portable Compaction- Vibratory Ram	D	0	8	0.25	0.00	313.05	195.66	46.96	0.21	39.13	0.00	0.00	0.00	0.00	0.00
Articulating Boom Platforms	D	0	8	0.25	0.00	313.05	195.66	46.96	0.21	39.13	0.00	0.00	0.00	0.00	0.00
Pumps	G	2	8	0.13	2.03	79.44	13813.38	748.58	0.00	2.35	0.16	28.07	1.52	0.00	0.00
Air Compressor 185 CFM	D	1	8	1.27	10.16	313.05	195.66	46.96	0.21	39.13	3.18	1.99	0.48	0.00	0.40
Air Compressor 750 CFM	D	0	8	1.27	0.00	313.05	195.66	46.96	0.21	39.13	0.00	0.00	0.00	0.00	0.00
Concrete Vibrators	D	0	8	0.25	0.00	313.05	195.66	46.96	0.21	39.13	0.00	0.00	0.00	0.00	0.00
Concrete Trowel Machine	D	0	0.8	1.27	0.00	313.05	195.66	46.96	0.21	39.13	0.00	0.00	0.00	0.00	0.00
Fusion Welder	D	0	8	1.27	0.00	313.05	195.66	46.96	0.21	39.13	0.00	0.00	0.00	0.00	0.00
Portable Power Generators	D	0	8	1.27	0.00	313.05	195.66	46.96	0.21	39.13	0.00	0.00	0.00	0.00	0.00
Total											136.13	64.92	10.69	0.12	6.36
Total for Gasoline-Powered Eqt											0.95	36.52	2.10	0.00	0.02
Total for Diesel-Powered Eqt											135.18	28.40	8.59	0.11	6.33

Notes:
(1) See notes for combustion emissions.

Delivery Truck Daily Emissions (Month 7) Walnut Energy Center Project													
Number of Deliveries Per Day(1)	Average Round Trip Haul Distance (miles)	Vehicle Miles Traveled Per Day	Emission Factors (lbs/vmt)(1)					Daily Emissions (lbs/day)				
			NOx	CO	POC	SOx	PM10	NOx	CO	POC	SOx	PM10
10	70	700	0.0280	0.0175	0.0025	0.0012	0.0016	19.61	12.27	1.76	0.81	1.10
Idle exhaust (2)												0.042

Notes:
(1) See notes for combustion emissions.
(2) 10 trucks per day times 1 hr idle time per visit times 0.0042 lb/hr.

Delivery Truck Daily Emissions (Month 16) Walnut Energy Center Project												
Number of Deliveries Per Day(1)	Average Round Trip Haul Distance (miles)	Vehicle Miles Traveled Per Day	Emission Factors (lbs/vmt)(1)					Daily Emissions (lbs/day)				
			NOx	CO	POC	SOx	PM10	NOx	CO	POC	SOx	PM10
20	70	1400	0.0280	0.0175	0.0025	0.0012	0.0016	39.23	24.54	3.52	1.62	2.20
Idle exhaust (2)												0.084

Notes:
(1) See notes for combustion emissions.
(2) 20 trucks per day times 1 hr idle time per visit times 0.0042 lb/hr.

Delivery Truck Annual Emissions Walnut Energy Center Project												
Average Number of Deliveries Per Year	Average Round Trip Haul Distance (miles)	Vehicle Miles Traveled Per Year	Emission Factors (lbs/vmt)(1)					Annual Emissions (tons/yr)				
			NOx	CO	POC	SOx	PM10	NOx	CO	POC	SOx	PM10
2600	70	182000.00	0.0280	0.0175	0.0025	0.0012	0.0016	2.55	1.60	0.23	0.11	0.14
Idle exhaust (2,3)												0.00546

Notes:
(1) See notes for combustion emissions.
(2) Annual average of 10 trucks per day, 240 days per year times 1 hr idle time per visit times 0.0042 lb/hr
(3) Based on 1.91 g/hr idle emission rate for the composite HDD truck fleet in 2001 from EPA's PART5 model.

Worker Travel Daily Emissions (Month 7) Walnut Energy Center Project														
Number of Workers Per Day(1)	Average Vehicle Occupancy (person/veh.)	Number of Round Trips Per Day	Average Round Trip Haul Distance (Miles)	Vehicle Miles Traveled Per Day (Miles)	Emission Factors (lbs/vmt)(1)					Daily Emissions (lbs/day)				
					NOx	CO	POC	SOx	PM10	NOx	CO	POC	SOx	PM10
205	1.3	158	70	11038	0.0029	0.0343	0.0027	0.0000	0.0001	31.71	379.11	30.27	0.02	0.64

Notes:
(1) See notes for combustion emissions.

Worker Travel Daily Emissions (Month 16) Walnut Energy Center Project														
Number of Workers Per Day(1)	Average Vehicle Occupancy (person/veh.)	Number of Round Trips Per Day	Average Round Trip Haul Distance (Miles)	Vehicle Miles Traveled Per Day (Miles)	Emission Factors (lbs/vmt)(1)					Daily Emissions (lbs/day)				
					NOx	CO	POC	SOx	PM10	NOx	CO	POC	SOx	PM10
386	1.3	297	70	20785	0.0029	0.0343	0.0027	0.0000	0.0001	59.71	713.83	57.00	0.04	1.21

Notes:
(1) See notes for combustion emissions.

Worker Travel Annual Emissions Walnut Energy Center Project															
Average Number of Workers Per Day	Average Vehicle Occupancy (person/veh.)	Number of Round Trips Per Day	Average Round Trip Haul Distance (Miles)	Days per Year	Vehicle Miles Traveled Per Year	Emission Factors (lbs/vmt)(1)					Annual Emissions (tons/yr)				
						NOx	CO	POC	SOx	PM10	NOx	CO	POC	SOx	PM10
205	1.3	158	70	250	2,759,615	0.0029	0.0343	0.0027	0.0000	0.0001	3.96	47.39	3.78	0.00	0.08

Notes:
(1) See notes for combustion emissions.

Daily Fugitive Dust Emissions (Month 7) Walnut Energy Center Project Equipment	Number of Units	Daily Process Rate Per Unit	Total Process Rate	Units	PM10 Emission Factor(1) (lbs/unit)	Control Factor(1) (%)	PM10 Emissions (lbs/day)
Bulldozer D6H	1	8.0	8.0	hours	2.4506	78%	4.22
Bulldozer D4C	1	8.0	8.0	hours	2.4506	78%	4.22
Excavator- Trencher Excavation	0						
Excavator- Earth Scraper Excavation	3	8.0	24.0	hours	2.4506	78%	12.66
Excavator- Earth Scraper Unpaved Road Travel	3	14.5	43.6	vmt	0.3421	88%	1.86
Excavator-Motor Grader	1	24.0	24.0	vmt	0.2754	78%	1.42
Excavator- Backhoe Excavation	0						
Excavator - Loader Excavation	1	3,250.0	3,250.0	tons	0.0014	78%	0.97
Excavator - Loader Unpaved Road Travel	1	28.4	28.4	vmt	0.1478	88%	0.52
Water Truck Unpaved Road Travel	1	20.0	20.0	vmt	0.1960	88%	0.49
Forklift Unpaved Road Travel	1	16.0	16.0	vmt	0.1249	88%	0.25
Dump Truck Unpaved Road Travel	2	13.6	27.3	vmt	0.2046	88%	0.70
Dump Truck Unloading	2	1,625.0	3,250.0	tons	0.0014	78%	0.97
Service Truck Unpaved Road Travel	0						
Fuel/Lube Truck Unpaved Road Travel	1	3.4	3.4	vmt	0.1521	88%	0.06
Concrete Pumper Truck Unpaved Road Travel	0						
Tractor Truck 5th Wheel Unpaved Road Travel	0						
Pickup Truck Unpaved Road Travel	2	17.0	34.1	vmt	0.0771	88%	0.33
3 ton Truck Unpaved Road Travel	1	8.5	8.5	vmt	0.1035	88%	0.11
Windblown Dust (active construction area)	N/A	816,927.0	816,927.0	sq.ft.	2.523E-05	88%	2.57
Worker Gravel Road Travel	205	0.5	100.9	vmt	0.0615	88%	0.77
Delivery Truck Gravel Road Travel	10	0.5	4.9	vmt	0.1631	88%	0.10
Delivery Truck Unpaved Road Travel	10	0.2	1.7	vmt	0.2046	88%	0.04
Total =							32.26

Notes:
(1) See notes for fugitive dust emission calculations.

Annual Fugitive Dust Emissions Walnut Energy Center Project			
Activity	Average Daily PM10 Emissions(1) (lbs/day)	Days per Year	Annual PM10 Emissions (tons/yr)
Construction Activities	7.69	250	0.96
Windblown Dust	0.66	365	0.12
Total =			1.08

Notes:
(1) Based on average of daily emissions during 22 month construction period.

Natural Gas Pipeline Construction Heavy Equipment Daily Emissions

Equipment	Equipment Rating	Units	Load Factor(1)	Number of Units	Hrs/Day Per Unit	Emission Factors (1) NOx	CO	VOC	SOx	PM10	Units	Daily Emissions (lbs/day) NOx	CO	VOC	SOx	PM10
Trencher	150	bhp	0.38	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	8.67	1.26	0.50	0.23	0.38
Backhoe	100	bhp	0.38	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	5.78	0.84	0.34	0.15	0.25
Compactor	100	bhp	0.59	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	8.97	1.30	0.52	0.24	0.39
Paving machine	100	bhp	0.56	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	8.52	1.23	0.49	0.22	0.37
Grader	100	bhp	0.54	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	8.21	1.19	0.48	0.22	0.36
Water Truck	150	bhp	0.65	1	10	3.36	2.60	0.39	0.18	0.22	gm/bhp-hr	7.22	5.59	0.84	0.39	0.47
Fuel/lube truck	175	bhp	0.65	1	10	3.36	2.60	0.39	0.18	0.22	gm/bhp-hr	8.43	6.52	0.98	0.45	0.55
Total =												55.81	17.93	4.14	1.89	2.77

Notes:
(1) See notes for combustion emissions.

Water Pipeline Construction Heavy Equipment Daily Emissions

Equipment	Equipment Rating	Units	Load Factor(1)	Number of Units	Hrs/Day Per Unit	Emission Factors (1) NOx	CO	VOC	SOx	PM10	Units	Daily Emissions (lbs/day) NOx	CO	VOC	SOx	PM10
Trencher	150	bhp	0.38	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	8.67	1.26	0.50	0.23	0.38
Backhoe	100	bhp	0.38	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	5.78	0.84	0.34	0.15	0.25
Compactor	100	bhp	0.59	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	8.97	1.30	0.52	0.24	0.39
Loader	150	bhp	0.38	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	8.67	1.26	0.50	0.23	0.38
Grader	100	bhp	0.54	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	8.21	1.19	0.48	0.22	0.36
Water Truck	150	bhp	0.65	1	10	3.36	2.60	0.39	0.18	0.22	gm/bhp-hr	7.22	5.59	0.84	0.39	0.47
Dump Truck	300	bhp	0.65	1	10	3.36	2.60	0.39	0.18	0.22	gm/bhp-hr	14.44	11.18	1.68	0.77	0.95
Total =												61.98	22.61	4.85	2.22	3.17

Notes:
(1) See notes for combustion emissions.

Transmission Line Interconnect Construction Heavy Equipment Daily Emissions

Equipment	Equipment Rating	Units	Load Factor(1)	Number of Units	Hrs/Day Per Unit	Emission Factors (1) NOx	CO	VOC	SOx	PM10	Units	Daily Emissions (lbs/day) NOx	CO	VOC	SOx	PM10
Auger	150	bhp	0.75	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	17.11	2.48	0.99	0.45	0.74
Backhoe	100	bhp	0.38	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	5.78	0.84	0.34	0.15	0.25
Crane	250	bhp	0.43	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	16.35	2.37	0.95	0.43	0.71
Crawler Tractor	300	bhp	0.57	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	26.01	3.77	1.51	0.68	1.13
Water Truck	150	bhp	0.65	1	10	3.36	2.60	0.39	0.18	0.22	gm/bhp-hr	7.22	5.59	0.84	0.39	0.47
Air Compressor	50	bhp	0.48	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	3.65	0.53	0.21	0.10	0.16
Total =												76.13	15.58	4.83	2.20	3.47

Notes:
(1) See notes for combustion emissions.

Natural Gas Pipeline Construction Delivery Truck Daily Emissions

Number of Deliveries Per Day	Average Round Trip Haul Distance (miles)	Vehicle Miles Traveled Per Day	Emission Factors (lbs/vmt)(1) NOx	CO	VOC	SOx	PM10	Daily Emissions (lbs/day) NOx	CO	VOC	SOx	PM10
4	165.6	662.4	0.028018	0.017529	0.002516	0.001158	0.001575	18.56	11.61	1.67	0.77	1.04

Notes:
(1) See notes for combustion emissions.

Natural Gas Pipeline Construction Worker Travel Daily Emissions

Number of Workers Per Day	Average Vehicle Occupancy (person/veh.)	Number of Round Trips Per Day	Average Round Trip Haul Distance (Miles)	Vehicle Miles Traveled Per Day (Miles)	Emission Factors (lbs/vmt)(1) NOx	CO	POC	SOx	PM10	Daily Emissions (lbs/day) NOx	CO	POC	SOx	PM10
12	1.3	18	70	1292	0.00	0.034344	0.002743	1.88E-06	5.83E-05	3.71	44.38	3.54	0.00	0.08

Water Pipeline Construction Delivery Truck Daily Emissions

Number of Deliveries Per Day	Average Round Trip Haul Distance (miles)	Vehicle Miles Traveled Per Day	Emission Factors (lbs/vmt)(1) NOx	CO	VOC	SOx	PM10	Daily Emissions (lbs/day) NOx	CO	VOC	SOx	PM10
6	165.6	993.6	0.028018	0.017529	0.002516	0.001158	0.001575	27.84	17.42	2.50	1.15	1.56

Notes:
(1) See notes for combustion emissions.

Water Pipeline Construction Worker Travel Daily Emissions

Number of Workers Per Day	Average Vehicle Occupancy (person/veh.)	Number of Round Trips Per Day	Average Round Trip Haul Distance (Miles)	Vehicle Miles Traveled Per Day (Miles)	Emission Factors (lbs/vmt)(1) NOx	CO	POC	SOx	PM10	Daily Emissions (lbs/day) NOx	CO	POC	SOx	PM10
12	1.3	18	70	1292	0.00	0.034344	0.002743	1.88E-06	5.83E-05	3.71	44.38	3.54	0.00	0.08

Transmission Line Interconnect Construction Delivery Truck Daily Emissions

Number of Deliveries Per Day	Average Round Trip Haul Distance (miles)	Vehicle Miles Traveled Per Day	Emission Factors (lbs/vmt)(1) NOx	CO	VOC	SOx	PM10	Daily Emissions (lbs/day) NOx	CO	VOC	SOx	PM10
10	165.6	1656	0.028018	0.017529	0.002516	0.001158	0.001575	46.40	29.03	4.17	1.92	2.61

Notes:
(1) See notes for combustion emissions.

Transmission Line Interconnect Construction Worker Travel Daily Emissions

Number of Workers Per Day	Average Vehicle Occupancy (person/veh.)	Number of Round Trips Per Day	Average Round Trip Haul Distance (Miles)	Vehicle Miles Traveled Per Day (Miles)	Emission Factors (lbs/vmt)(1) NOx	CO	POC	SOx	PM10	Daily Emissions (lbs/day) NOx	CO	POC	SOx	PM10
10	1.3	15	70	1077	0.00	0.034344	0.002743	1.88E-06	5.83E-05	3.09	36.99	2.95	0.00	0.06

Natural Gas Pipeline Construction Daily Fugitive Dust Emissions					
Operation	Daily Process Rate Per Unit	Units	PM10 Emission Factor(1) (lbs/unit)	Control Factor(1) (%)	PM10 Emissions (lbs/day)
Windblown Dust	2000	sq.ft./day	2.52E-05	66%	0.02
Excavation	667	cu.yd./day	0.0018	0%	1.20
Back filling	700	tons/day	0.0001	0%	0.07
Grader Operation	10	vmt	0.2754	0%	2.75
Water truck unpaved surface travel	10	vmt	0.1522	66%	0.51
Delivery truck unpaved surface trave	2	vmt	0.15888	66%	0.11
Total =					4.66

Notes:
(1) See notes for fugitive dust emission calculations.

Water Pipeline Construction Daily Fugitive Dust Emissions					
Operation	Daily Process Rate Per Unit	Units	PM10 Emission Factor(1) (lbs/unit)	Control Factor(1) (%)	PM10 Emissions (lbs/day)
Windblown Dust	3000	sq.ft./day	2.52E-05	66%	0.03
Excavation	1500	cu.yd./day	0.0018	0%	2.70
Back filling	900	tons/day	0.0001	0%	0.09
Grader Operation	8	vmt	0.2754	0%	2.20
Water truck unpaved surface travel	8	vmt	0.1522	66%	0.39
Delivery truck unpaved surface trave	1	vmt	0.15888	66%	0.06
Total =					5.47

Notes:
(1) See notes for fugitive dust emission calculations.

Transmission Line Interconnect Construction Daily Fugitive Dust Emissions					
Operation	Daily Process Rate Per Unit	Units	PM10 Emission Factor(1) (lbs/unit)	Control Factor(1) (%)	PM10 Emissions (lbs/day)
Windblown Dust	1000	sq.ft./day	2.52E-05	66%	0.01
Excavation	500	cu.yd./day	0.0018	0%	0.90
Back filling	250	tons/day	0.0001	0%	0.03
Water truck unpaved surface travel	2	vmt	0.1522	66%	0.10
Delivery truck unpaved surface trave	2	vmt	0.15888	66%	0.10
Total =					1.14

Notes:
(1) See notes for fugitive dust emission calculations.

Notes - Fugitive Dust Emission Calculations

(1) Paved road travel emission factors for delivery trucks and worker automobiles are based on AP-42, Section 13.2.1, 10/97.
(Based on default road silt loading shown in AP-42, page 13.2.1-5, 10/97, limited access roads.)

(2) Wind erosion emission factor for active construction area is based on "Improvement of Specific Emission Factors (BACM Project No. 1), Final Report", prepared for South Coast AQMD by Midwest Research Institute, March 1996.

(3) Finish grading emission factor is based on AP-42, Table 11.9-1, 7/98.

(4) Bulldozer excavation emission factor is based AP-42, Table 11.9-1, 7/98.
(Based on default soil silt and moisture contents shown in AP-42, Table 11.9-3, 7/98, exposed ground.)

(5) Material unloading emission factors are based on AP-42, p. 13.2.4-3, 1/95.
(Based on average annual wind speed recorded onsite and default soil moisture content shown in AP-42, Table 11.9-3, 7/98, exposed ground.)

(6) Loader unpaved surface travel emission factor is based on AP-42, Section 13.2.2, 1/95.
(Based on default soil silt and moisture contents shown in AP-42, Table 11.9-3, 7/98, exposed ground.)

(7) Trenching emission factor is based on AP-42, Table 11.9-2 (dragline operations), 1/95.
(Based on default soil moisture content shown in AP-42, Table 11.9-3, 7/98, exposed ground.)

(8) Unpaved surface travel emission factors for water trucks, fuel trucks, service trucks, dump trucks, forklifts, pickup trucks, delivery trucks, and concrete trucks are based on AP-42, Section 13.2.2, 9/98.
(Based on default soil silt and moisture contents shown in AP-42, Table 11.9-3, 7/98, exposed ground.)

(9) Dust control efficiency for unpaved road travel and active excavation area is based on "Control of Open Fugitive Dust Sources", U.S. EPA, 9/88.
(Based on default evaporation rate shown in EPA document, Figure 3-2, 9/88, and typical water application rate shown in EPA document, page 3-23, 9/88.)

Notes - Combustion Emissions

(1) For Construction Equipment
For heavy Diesel construction equipment, emission factors based on equipment meeting EPA 1996 off-road Diesel standards and use of CARB ultra low-sulfur fuel.
For trucks, depending on size of truck, emissions factors based on MVE17G version 1.0c for heavy-heavy duty or medium duty Diesel trucks, fleet average for calendar year 2000.
For portable equipment, emission factors based on EPA's "Non-road Engine and Vehicle Emission Study Report", 11/91, Table 2-07, for generator sets, welders, pumps, and air compressors less than 50 hp.

(2) For Delivery Trucks
From MVE17G version 1.0c, heavy-heavy duty Diesel trucks, fleet average for calendar year 2000.

(3) For Worker Travel
From MVE17G version 1.0c, average of light duty automobiles and light duty trucks, fleet average for calendar year 2000.

ATTACHMENT AQ-109

REVISED AFC TABLES

TABLE 8.1-24
Modeled Maximum Project Impacts (Revised 4/8/03)

Pollutant	Averaging Time	Maximum Facility Impact (µg/m3)	Background (µg/m3)	Total Impact (µg/m3)	State Standard (µg/m3)	Federal Standard (µg/m3)
NO_2	1-hour [a]	258.3	181	439	470	-
	Annual	0.60	35.8	36.4	-	100
SO_2	1-hour	62.6	76.0	138.6	650	-
	3-hour	~~34.1~~11.4	52.4	~~86.5~~63.8	-	1300
	24-hour	~~5.7~~0.2	23.6	~~29.3~~23.8	109	365
	Annual	0.02	5.2	5.2	-	80
CO	1-hour	187	5,730	5,917	23,000	40,000
	8-hour	~~58.5~~3.7	4,206	~~4,265~~4,210	10,000	10,000
PM_{10}	24-hour	~~3.4~~2.0	157	~~160.4~~159.0	50	150
	Annual[b]	0.3	33	33.3	30	-
	Annual[c]	0.3	45.9	46.2	20[d]	50

[a] Worst-case one-hour NO_x impacts are dominated by the Diesel fire pump, which will be operated for testing purposes only one hour per week. Worst-case hourly average NO_2 impacts during other periods will be only 8.3 ug/m3.
[b] Annual Geometric
[c] Annual Arithmetic Mean
[d] New state PM_{10} standard approved but not yet effective.

Note: this table replaces Table 8.1-24 found on page 8.1-53 in the AFC.

Table 8.1B-9
Walnut Energy Center
Refined Modeling Results (Revised 4/8/03)

Unit	Pollutant	Averaging Period	Max ug/m3	X m	Y M
HRSGs	NO2	1-hr	8.25652	90	-180
	CO	1-hr	10.05409	90	-180
	SO2	1-hr	1.12506	90	-180
Fire Pump	NO2	1-hr	258.28143	-9.1	-175.4
	CO	1-hr	112.63448	-9.1	-175.4
	SO2	1-hr	62.57471	-9.1	-175.4
All	NO2	1-hr	258.28143	-9.1	-175.4
	CO	1-hr	112.63448	-9.1	-175.4
	SO2	1-hr	62.57471	-9.1	-175.4
HRSGs	SO2	3-hr	0.50286	40.9	-250.4
Fire Pump	SO2	3-hr	~~34.11264~~ 11.37179	-9.1	-175.4
All	SO2	3-hr	~~34.11264~~ 11.37179	-9.1	-175.4
HRSGs	CO	8-hr	3.15696	40.9	-250.4
Fire Pump	CO	8-hr	~~29.8363~~ 3.7302	0	-180
All	CO	8-hr	~~29.8363~~ 3.7302	0	-180
HRSGs	PM10	24-hr	2.03402	60	-210
	SO2	24-hr	0.18409	60	-210
Fire Pump	PM10	24-hr	~~3.41414~~ 0.14226	-9.1	-175.4
	SO2	24-hr	~~5.69024~~ 0.23708	-9.1	-175.4
Cooling Towers	PM10	24-hr	0.56193	120	-390
All	PM10	24-hr	~~3.41417~~ 2.04164	~~-9.1~~ 60	~~-175.4~~ -210
	SO2	24-hr	~~5.69024~~ 0.23708	-9.1	-175.4
HRSGs	NO2	Annual	0.1285	960	-1110
	PM10	Annual	0.19232	960	-1110
	SO2	Annual	0.01751	960	-1110
Fire Pump	NO2	Annual	0.52885	-9.1	-225.401
	PM10	Annual	0.00915	-9.1	-225.401
	SO2	Annual	0.01526	-9.1	-225.401
Cooling Towers	PM10	Annual	0.08949	540	-840
All	NO2	Annual	0.56721	-9.1	-225.401
	PM10	Annual	0.26706	780	-1020
	SO2	Annual	0.02048	-9.1	-225.401

Note: This table replaces Table 8.1B-9 of Appendix 8.1B of the AFC (Volume 2).

WALNUT ENERGY CENTER
(02-AFC-4)
DATA RESPONSES, SET 2A

Technical Area: Visual Resources
CEC Author: Eric Knight and William Walters
WEC Authors: Wendy Haydon, Jim McLucas, and Gary Rubenstein

BACKGROUND

Data Requests Nos. 77-79 requested the Applicant to explain how the project would comply with policies and requirements in the Turlock General Plan and Zoning Ordinance intended to minimize adverse visual impacts on adjacent residential areas. The Applicant responded that they would not provide landscaping on the south boundary of the site because “it is not required by the City of Turlock and would be incompatible and out of character with the area.” As stated in the data response, the City of Turlock considers the residences along Ruble Road (currently outside the city limit boundary) south of the project site as “transitional uses” that “will eventually give way to industrial development.” The timeframe within which this transition will occur is not specified.

Staff does not agree that landscaping of the project site would be out of character with the area. Although most of the industrial development in the area is not landscaped or screened (which has contributed to the degradation of visual quality in the area), it is not the case for all of the industrial facilities. At the California Dairies facility located about 1,800 feet east of the project site, tall redwood trees are growing within the road setback area along Tegner Road. The redwoods provide partial screening of the dairy structures from Tegner Road and enhance the entrance to the dairy. What appear to be cypress or cedar trees have recently been planted closely together along the fence of a cell tower located on Ruble Road directly opposite a residence. In addition, many of the residences in the area have been extensively landscaped. A residence on Fransil Lane at West Main Street, located about 2,000 feet northeast of the site, has been landscaped with a dense row of tall Italian cypress trees along the south property line. The trees appear to have been planted to screen views from the property toward the industrial facilities (such as Del Mesa and Foster Farms) located south of West Main Street. A dense row of vegetation along Linwood Avenue south of the project site screens views of a dairy farm operation from the residences along Linwood Avenue.

To reduce the project’s contribution to potentially significant cumulative impacts (when combined with the effects of past projects), Staff believes that a combination of perimeter landscaping along portions of the west and south property lines (South Washington Road viewing area – KOP 4) and offsite landscaping at the residence at the western end of Ruble Road is needed. The project would be clearly evident from these viewing areas (which would have unobstructed foreground views of the project) and would contribute considerably to the significant cumulative visual impact caused by existing industrial uses in the project area. Landscaping in these areas that would substantially screen the project structures would reduce the project’s contribution to the significant cumulative impact to a level that would be less than cumulatively considerable.

To comply with City Design Element Policy 7.4-d and Zoning Ordinance 90-2-109(a)(1), which require enhancing the visual attractiveness of the community and development by providing attractive streetscapes and landscape screening, the Applicant proposes to install landscaping at the power plant entrance on Washington Road. In Data Request No. 79, Staff had asked for a conceptual landscape plan not only depicting landscaping to screen the project but also the landscaping proposed to enhance the visual attractiveness of the streetscape and property as required by the Turlock General Plan and Zoning Ordinance. A plan showing the extent of the proposed landscaping and a description of the type, number, planting size and growth rate of the proposed plant species was not provided as requested.

DATA REQUEST

111a. Please provide a conceptual landscape plan (at a reasonable scale) depicting the plant species proposed to enhance the power plant entrance road consistent with the Turlock General Plan and Zoning Ordinance. Please show on the plan landscaping along the west and south property (69-acre parcel) boundaries that would be effective at substantially screening the project structures (not necessarily the HRSG stacks) from view from the residences in the area of KOP 4 along South Washington Road.

Response: A conceptual landscape plan (Figure VIS-111a) is attached that shows the Applicant's planned landscaping at the entrance to the proposed power plant on S. Washington Road. As shown in Figure VIS-111a, a total of 66 plants are proposed at the entrance to the power plant. Table VIS-111, attached, lists the species proposed at the entrance to the plant and other requested information, such as the number of plants, plant size, and plant growth rates.

The Applicant acknowledges Commission Staff's suggestion to landscape the western and southern boundaries of the 69-acre parcel on which the 18-acre project site is located. For reasons that are discussed below, the Applicant is not submitting a plan that provides for landscaping along these boundaries of the larger project property. Pursuant to recent discussions with Staff, in lieu of this perimeter landscaping, a plan is being submitted as Figure VIS-111b which provides for the establishment of screening plantings on certain nearby residential properties where Staff has indicated the project would affect the views of its occupants.

As indicated in the Background Statement above, one of Commission Staff's rationales for requesting that the Applicant install screening landscaping along the western and southern boundaries of the larger project property appears to be that industrial facilities along S. Tegner Road have landscaping, and that certain residences in the vicinity of those other facilities have been landscaped to screen views of these facilities. In applying

TABLE VIS-111
Plant Species, Plant Sizes and Quantities, and Species Growth Rates for Landscaping Proposed for the Walnut Energy Center

Species				Number of Plants			Species Growth Rates[c]					
Plant Type	**Common Name**	**Scientific Name**	**Plant Size[a]**	**At the Plant Entrance**	**At the 4 Residences[b]**	**Total Plants**	**1 Year**	**5 Years**	**10 Years**	**20 Years**	**30 Years**	**40 Years**
Evergreen tree	Coast Redwood	*Sequoia sempervirens*	15 gal	0	6	6	10	15	40	60	70	95
Deciduous tree	California Sycamore	*Platanus racemosa*	15 gal	0	1	1	10	20	30	50	65	85
Flowering shrub	Crape Myrtle	*Lagerstroemia indica*	5 gal	6	0	6	5	18	25	35	35	35
Flowering shrub	Blue Blossom	*Ceanothus thyrsiflorus*	5 gal	10	0	10	2	5	12	15	15	15
Groundcover/ vine	Orange Honeysuckle	*Lonicera ciliosa*	1 gal	50	10	60	5 H[d]	10 H	10 H	10 H	10 H	10 H

[a]Expressed in gallons (gal).

[b]The quantities expressed in this column are the totals for the four residences. The quantities for each residence are:

KOP 4 - 2 Coast Redwood
RES A - 2 Coast Redwood
RES B - 2 Coast Redwood
RES C - 1 California Sycamore, 10 Orange Honeysuckle

[c]All growth rates are expressed in feet.

[d]All growth rates are expressed as height, except for the groundcover, Orange Honeysuckle, which is expressed as horizontal feet (H).

this rationale, Staff equates the Applicant's project along S. Washington Road to the industrial facilities that are located along S. Tegner Road. Industrial facilities along a fully-improved street (a paved, striped roadway that has a curb, gutter, and sidewalk), such as S. Tegner Road, are different situations than the project proposed by TID. The industrial facilities along S. Tegner Road are set back from the roadway approximately 100 to 300 feet. The Applicant's proposed project is planned to be constructed within a large parcel of land and the facilities would be set back from S. Washington Road approximately 1,900 feet (not fronting on the roadway), and the entrance to the project would be from a rural roadway, rather than a fully improved street.

The landscaping that has been planted at the industrial facilities located on S. Tegner Road (California Dairies, Inc., Cal-Coast Dairy Systems, Inc., and A.T.B. Packing Co., for examples) is ornamental landscaping to improve the streetscape, rather than facility screening landscaping. For example, the landscaping trees at California Dairies are perpendicular to S. Tegner Road, not parallel to it, so they do not screen views of that facility from the closest residences across the street (312, 410, and 412 S. Tegner Road). These three residences have trees in their front yards, which may partially screen views of California Dairies when leafed out. Screening landscaping does not exist at these industrial facilities' parcel boundaries; only ornamental landscaping is provided along the street frontage. It is also noted that Simon Newman Feedmill, which has a long entry road from S. Tegner Road, has no landscaping at its entrance.

The City of Turlock required that screening vegetation (evergreen climbing vines) be planted at the cell tower site on Ruble Road (the Nextel site). The City then approved junipers for screening vegetation instead of the vines. The City did not require the entire 20-acre site to have screening; it only required that the site fenceline that fronts on Ruble Road be screened (pers. comm. between Dana McGarry and Susan Strachan, March 28, 2003).

As a matter of law, the Applicant respectfully disagrees with Staff's analysis and conclusions that the project would contribute to a potentially significant cumulative impact under CEQA.[13] For example, CEQA does not allow the Staff to find a significant "cumulative" impact by combining, or adding together, one or more insignificant

---

[13] The CEQA Guidelines define "Cumulative Impacts" as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." (CCR Section 15355). The cumulative impact from several projects is "the change in the environment which results from the incremental impact of the project when added to other *closely related past, present, and reasonably foreseeable probable projects*." Emphasis added. CCR Section 15355(b). The CEQA Guidelines require discussion of cumulative impacts when the project's incremental effect is "cumulatively considerable", as defined in Section 15065(c) of the Guidelines (CCR Section 15130(a)). Where an incremental effect is not "cumulatively considerable," a lead agency need not consider that effect significant (CCR 13130(a)). Mitigation measures are not required for effects which are not found to be significant (CCR Section 15126.4(a)(3)), and mitigation measures must be "roughly proportional" to the impacts of the project (CCR Section 15126.4(a)(4)(B)).

impacts of the WEC project. (Counsel for the Applicant is available to discuss these purely legal matters outside this Data Response.)

With regard to Staff's suggested landscaping plans, the Applicant respectfully disagrees with Staff's assertion that the project would contribute to significant cumulative visual impacts that require planting along the project property's western and southern boundaries as mitigation. The Applicant has concluded in its AFC that the WEC project's contribution to cumulative impacts would not be significant. This conclusion is based on the fact that the presence of the project would not change the overall character or quality of the existing landscape in the project vicinity, which was documented by the Applicant's systematic analysis of the impacts of the project as viewed from KOPs 1, 2, 3, and 4.

The area in which the project is located is considered industrial. Specifically, there are several other industrial facilities in the vicinity of the project with tall features that have no visual screening (except for those facilities where the City has required ornamental landscaping as part of its street improvements). The WEC project is consistent with the existing and future uses in the industrial zone and will not change the overall character or quality of the existing landscape in the project vicinity. The Applicant, in choosing the specific site for the project, picked a location as close as possible to a neighboring industrial facility. In addition, the project site is designed such that the HRSG stacks align with the tall features of the adjacent industrial property, blending the project's tallest features with those of the neighboring industry. The existing industrial development provides the visual baseline for the area; the WEC project is consistent with this and does not significantly change the visual character or quality of the local landscape.

The Applicant's view is that not only is landscaping along the project property's western and southern boundaries not necessary, but that there are also a number of practical considerations that make it ill-advised:

- Landscaping at the edges of the agricultural fields would interfere with the existing cropping of those fields (i.e., interfere with use of agricultural equipment and cause the farmer to take a portion of his field out of agricultural production to accommodate the screening landscaping).
- There is the potential for lower crop productivity to occur near the screening landscaping due to shading effects from the landscaping on the crops.
- Because the majority of the 69-acre parcel would continue to be cropped after the project is constructed, during certain times of the year, crops will provide a visual buffer to nearby residents, already providing partial screening of views of the facilities.

- The Applicant has an obligation to its ratepayer/owners to manage its assets responsibly. Landscaping along the western and southern boundaries of the 69 acres could be inconsistent with its future use of the property.

Therefore, the Applicant believes that requiring landscaping at the western and southern boundaries of the 69-acre parcel is neither appropriate, nor necessary.

The Applicant agrees that certain residences in the vicinity of the industrial facilities along S. Tegner Road and W. Main Street have vegetation in their yards that may be considered screening vegetation. As such, and in an effort to reduce the less-than-significant visual impact from KOP 4, its nearby residences, and the westernmost residence on Ruble Road even further, in lieu of planting vegetative screening at the western and southern parcel boundaries, the Applicant discussed with Staff its interest in planting screening vegetation at these residences. This approach appears consistent with what is seen in the project vicinity.

A conceptual landscape plan (Figure VIS-111b) is attached that shows the landscaping proposed by the Applicant at the four residences located in the vicinity of the proposed plant. The residences are: (1) the front yard of the KOP 4 residence, located at 807 Washington Road (KOP 4 on the figure); (2) the front yard of the residence located to the north of KOP 4 at 719 Washington Road (RES A on the figure); (3) the backyard of the residence located at 806 Washington Road, across the street from KOP 4 (RES B on the figure); and (4) the front yard of the residence at the west end of Ruble Road (RES C on the figure). A total of 17 plants are proposed at these four residences. Table VIS-111, attached, lists the species proposed at each of these four residences and other requested information, such as the number of plants, plant size, and plant growth rates.

Although the Applicant's analysis did not conclude that the project poses a significant visual impact that requires it to provide mitigation, the Applicant is in the process of contacting the property owners of these four residences to discuss the provision of the screening vegetation on their properties that is indicated in Figure VIS-111b. At this point, the property owners have not responded. However, the Applicant will continue its effort.

111b. Please discuss whether TID would be willing to plant trees in the front yard area of the residential property at the western end of Ruble Road. If TID is willing to do so, after speaking with the owner of this property, please discuss whether the property owner would be interested in TID planting additional trees in the front yard of his property to screen views of the project structures from the residences on his property.

Response: Please refer to Data Response #111a.

SYMBOL	TYPE OF PLANT	SUGGESTED SPECIES	SIZE	NUMBER OF PLANTS
ಲ	GROUNDCOVER / VINE	LONICERA CILIOSA	1 GAL	50
❁	FLOWERING SHRUB	LAGERSTROEMIA INDICA*	5 GAL	6
❀	FLOWERING SHRUB	CEANOTHUS THYRSIFLORUS*	5 GAL	10

★ = USE VARIETY OF THE SPECIES THAT IS OF APROPRIATE HEIGHT

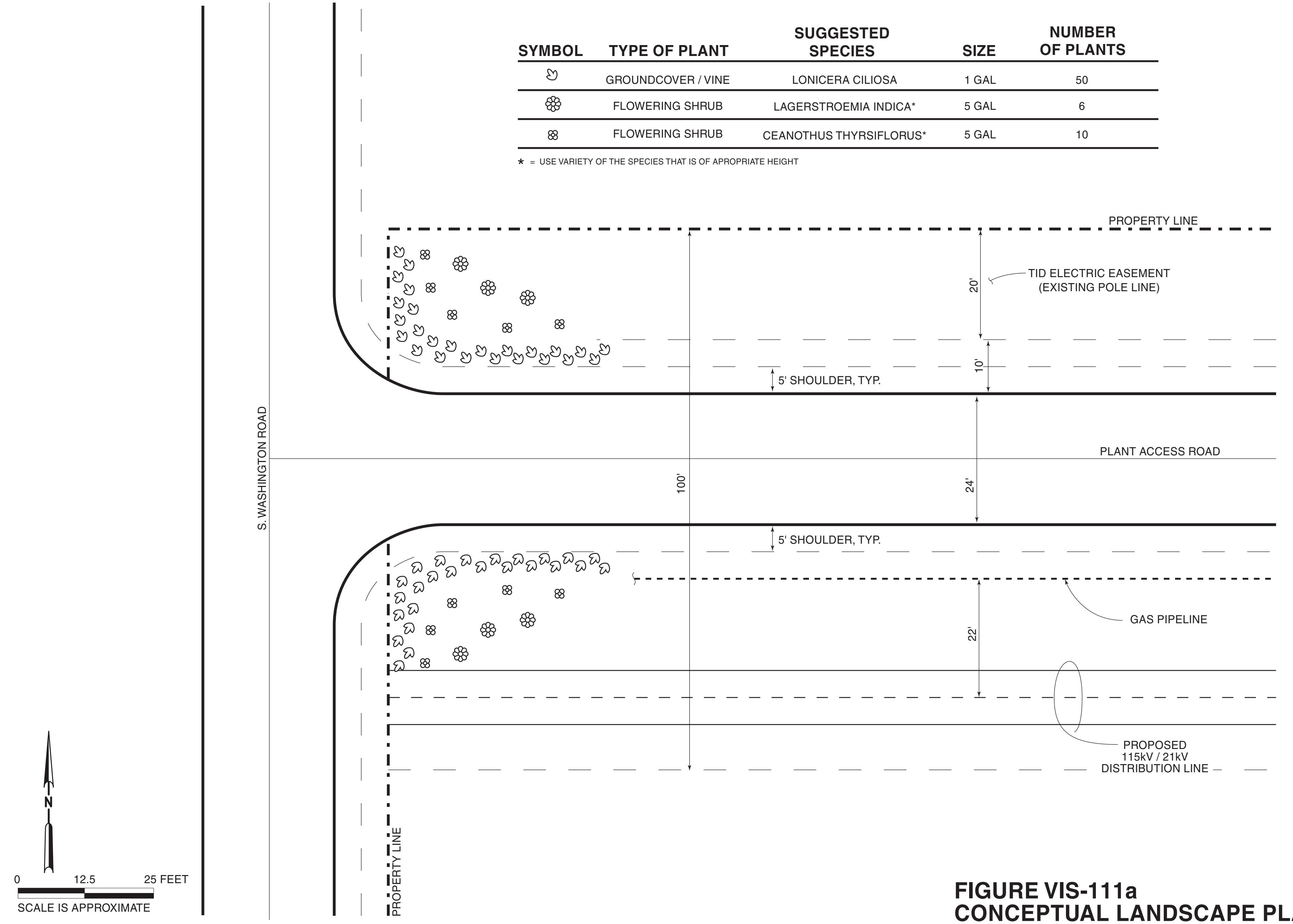


FIGURE VIS-111a
CONCEPTUAL LANDSCAPE PLAN OF PROPOSED FACILITY ENTRANCE

WALNUT ENERGY CENTER

CH2MHILL

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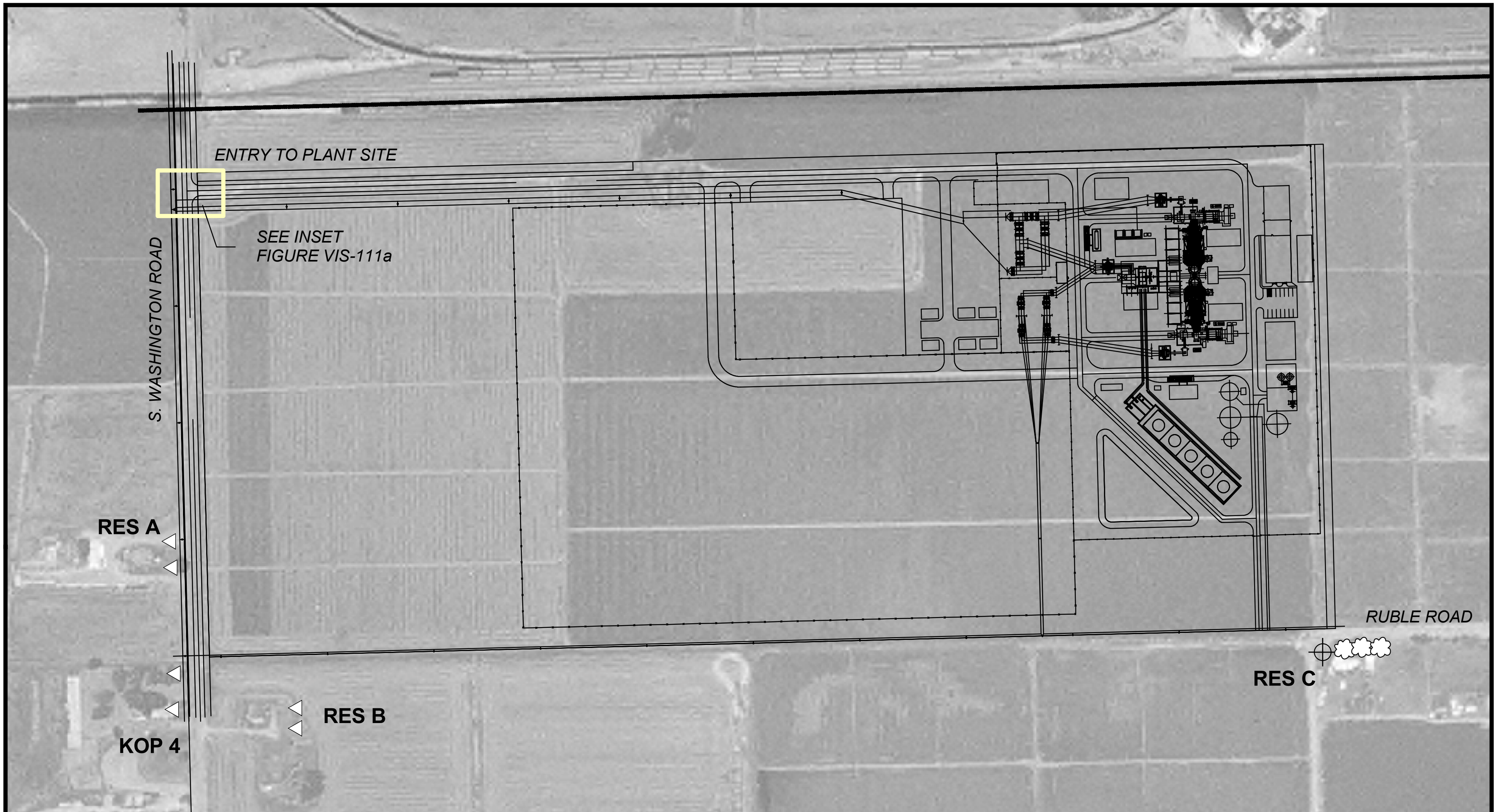

PLANT PALETTE LEGEND

SYMBOL	TYPE OF PLANT	SUGGESTED SPECIES	SIZE	NUMBER OF PLANTS
◁	Evergreen Tree	Sequoia sempervirens	15 Gal.	6 Plants
⊕	Deciduous Tree	Plantanus racemosa	15 Gal.	1 Plants
(cloud symbol)	Groundcover/vine	Lonicera ciliosa	1 Gal.	10 Plants
▭	WEC PLANT SITE			

0 350 Feet
1" = 350'

FIGURE VIS-111b
CONCEPTUAL LANDSCAPE PLAN OF FOUR RESIDENCES IN THE PROJECT VICINITY
WALNUT ENERGY CENTER

CH2MHILL

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WALNUT ENERGY CENTER
(02-AFC-4)
DATA RESPONSES, SET 2A

Technical Area: Visual Resources - Plume
CEC Author: William Walters
WEC Authors: Gary Rubenstein/Jeff Adkins

BACKGROUND

In recent projects, with conventional wet cooling towers, Staff has proposed cooling tower Conditions of Certification that require the project owner to build the cooling tower as it was proposed in the AFC and/or data responses. This limits the visible plume potential to what was evaluated by Staff. However, on a couple of occasions Applicants have sought to change the Condition of Certification to allow safety factors in the cooling tower design parameters. Changing the cooling tower design variables impacts the plume frequency analysis and requires Staff to re-analyze the revised cooling tower design well beyond the normal discovery and analysis period. Therefore, Staff is requesting an assurance that the cooling tower data provided in Data Response 81 includes suitable design parameter safety factors, or that the Applicant provide appropriate design parameter safety factors prior to the initial plume modeling analysis.

DATA REQUESTS

112. Staff may determine that a cooling tower design condition, similar to those proposed for the East Altamont Energy Center (EAEC) or SMUD Cosumnes projects, is warranted in this case. Staff will use an exhaust flow rate per heat rejection rate value as the primary cooling tower design parameter. Please identify if any heat rejection rate or exhaust flow rate safety factors should be applied to the values provided in Data Response 81, and if so please provide the requested safety factors.

    Response: The requested safety factors (e.g., condition margins) are provided as Attachment VIS-112.

ATTACHMENT VIS-112

Condition Margins

	Hot Base	Average Base	Cold Base
Design Case			
Configuration (CT x ST, Power Density)	2 x 1, NPD	2 x 1, NPD	2 x 1, NPD
Dry Bulb Temperature, deg. F	97	61	32
Wet Bulb Temperature, deg. F	70	53	31
Number of Combustion Turbines Operating	2	2	2
Combustion Turbine Load, %	100%	100%	100%
Evaporative Cooling (Yes/No?)	Yes	Yes	No
Power Augmentation (Yes/No?)	No	No	No
Duct Burning (Yes/No?)	No	No	No
Site Altitude, ft	85	85	85
Barometric Pressure, psia	14.65	14.65	14.65
Cooling Tower Data			
Allowance to WB Temp to Account for Recirculation, deg. F	2	2	-
Cooling Tower Design Wet Bulb Temperature, deg. F	72	55	31
Number of Cells	5	5	5
Number of Fans Operating	5	5	4
Leaving Air Flow/Cell, cfm	1,645,000	1,635,000	1,635,000
Total Leaving Air Flow, cfm	8,225,000	8,175,000	6,540,000
Temperature of Leaving Air, deg. F	90	79	71
Heat Rejected from CW, MMBtu/hr	640	650	671
Density of Leaving Air, lbs/cf	0.0707	0.0725	0.0737
Exhaust Flow/Cell, lbs/min	116,308	118,572	120,560
Exhaust Flow/Cell, kg/sec	879	896	911
Margined Exhaust Flow, kg/sec	791	807	820
Tower Heat Input, MMBtu/hr	640	650	671
Tower Heat Input, MW	188	191	197
Heat Input/Cell, MW	37.5	38.1	49.2
Margined Heat Input, MW	41.3	41.9	54.1
Factor, kg/sec-MW	23.4	23.5	18.5
Margined Factor, kg/sec-MW	19.2	19.2	15.2
Minimum Factor for Base Load Operation, kg/sec-MW	15.2		
Exhaust Flow Margin	-10%		
Heat Input Margin	10%		

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TID'S WALNUT ENERGY CENTER PROJECT
APPLICATION FOR CERTIFICATION,
DOCKET NO. 02-AFC-4

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I declare that I transmitted the foregoing document via e-mail, or as indicated by first class postal mail, to the above named on the date indicated thereby. I declare under penalty of perjury that the foregoing is true and correct.

John L. Carrier, J.D.
Program Manager
CH2M HILL